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14. ABSTRACT

Project CHECO was established in 1962 to document and analyze air operations in Southeast Asia. Over the years the meaning of the acronym changed several times to reflect the escalation of operations: Current Historical Evaluation of Counterinsurgency Operations, Contemporary Historical Evaluation of Combat Operations and Contemporary Historical Examination of Current Operations. Project CHECO and other U. S. Air Force Historical study programs provided the Air Force with timely and lasting corporate insights into operational, conceptual and doctrinal lessons from the war in SEA.

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PROJECT CHECO REPORT

Contemporary Historical Examination of Current Operations

AIR WAR IN THE DMZ
SEPTEMBER 1967 - JUNE 1968

1 AUGUST 1969

HQ PACAF

Directorate, Tactical Evaluation
CHECO Division

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Prepared by:

WILLIAM THORNDALE

Project CHECO 7th AF, DOAC

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PROJECT CHECO REPORTS

The counterinsurgency and unconventional warfare environment of Southeast Asia has resulted in the employment of USAF airpower to meet a multitude of requirements. The varied applications of airpower have involved the full spectrum of USAF aerospace vehicles, support equipment, and manpower. As a result, there has been an accumulation of operational data and experiences that, as a priority, must be collected, documented, and analyzed as to current and future impact upon USAF policies, concepts, and doctrine.

Fortunately, the value of collecting and documenting our SEA experiences was recognized at an early date. In 1962, Hq USAF directed CINCPACAF to establish an activity that would be primarily responsive to Air Staff requirements and direction, and would provide timely and analytical studies of USAF combat operations in SEA.

Project CHECO, an acronym for Contemporary Historical Examination of Current Operations, was established to meet this Air Staff requirement. Managed by Hq PACAF, with elements at Hq 7AF and 7AF/13AF, Project CHECO provides a scholarly, "on-going" historical examination, documentation, and reporting on USAF policies, concepts, and doctrine in PACOM. This CHECO report is part of the overall documentation and examination which is being accomplished. Along with the other CHECO publications, this is an authentic source for an assessment of the effectiveness of USAF airpower in PACOM.

Milton B Adams

MILTON B. ADAMS, Major General, USAF
Chief of Staff

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DEPARTMENT OF THE AIR FORCE
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Warren H. Peterson

WARREN H. PETERSON, Colonel, USAF
Chief, CHECO Division
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     - (13) AFXOTZ. 1
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- (b) DPL 2
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- (e) DIO 1

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  - 1. DORF 1
  - 2. DI 1
- (b) 19AF(DI). 1
- (c) USAFSOF(DO) 1

(3) WINGS
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- (b) 4TFW(DO). 1
- (c) 23TFW(DOI). 1
- (d) 27TFW(DOI). 1
- (e) 33TFW(DOI). 1
- (f) 64TFW(DO) 1
- (g) 67TRW(C). 1
- (h) 75TRW(DO) 1
- (i) 316TAW(DOP) 1
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- (m) 474TFW(TFOX). . . . 1
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- (r) 4554CCTW(DOI) . . . 1

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- (a) USAFTAWC(DA). . . . 2
- (b) USAFTARC(DID) . . . 2
- (c) USAFTALC(DCRL). . . 1
- (d) USAFTFWC(CRCD). . . 1
- (e) USAFSOC(DO) 1
- (f) USAFAGOS(DAB-C) . . . 1

b. SAC

(1) HEADQUARTERS
- (a) DOPL. 1
- (b) DPLF. 1
- (c) DM. 1
- (d) DI. 1
- (e) OA. 1
- (f) HI. 1

(2) AIR FORCES
- (a) 2AF(DICS) 1
- (b) 15AF(DI). 1

(3) AIR DIVISIONS
- (a) 3AD(DO) 3

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(1) HEADQUARTERS
- (a) MAOID 1
- (b) MAOCO 1
- (c) MACHO 1
- (d) MACOA 1

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- (b) 22AF(OCXI). 1

(3) WINGS
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- (b) 62MAWg(OCXP). 1
- (c) 436MAWg(OCXC) 1
- (d) 437MAWg(OCXI) 1
- (e) 438MAWg(OCXC) 1

(4) MAC SERVICES
- (a) AWS(AWXW) 1
- (b) ARRS(ARXLR) 1
- (c) ACGS(AGOV). 1
- (d) AAVS(AVODOD). 1

d. ADC

(1) HEADQUARTERS
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(2) AIR FORCES
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(3) AIR DIVISIONS
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(b) 29AD(ODC) 1
(c) 33AD(OIN) 1
(d) 35AD(CCR) 1
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(a) ATXPP 1

f. AFLC

(1) HEADQUARTERS
(a) MCVSS 1
(b) MCOO. 1

g. AFSC

(1) HEADQUARTERS
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(b) SCS-6 1
(c) SCGCH 2
(d) SCTPL 1
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(f) ESD(ESO). 1
(g) RADC(EMOEL) 2
(h) ADTC(ADGT). 1

h. USAFSS

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(b) CHO 1

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(b) 6940 Scty Wg(OOD) . . . 1

i. AAC

(1) HEADQUARTERS
(a) ALDCC-A 2

j. USAFSO
(1) HEADQUARTERS
(a) COH 1

k. PACAF

(1) HEADQUARTERS
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(b) DI. 1
(c) DPL 4
(d) CSH 1
(e) DOTEC 5
(f) DE. 1
(g) DM. 1
(h) DOTEC 1

(2) AIR FORCES
(a) 5AF(DOPP) 1
(b) Det 8, ASD(DOASD) . . . 1
(c) 7AF
1. DO 1
2. DIXA 1
3. DPL. 1
4. TACC 1
5. DOAC 2
(d) 13AF
1. CSH. 1
2. DPL. 1
(e) 7/13AF(CHECO) 1

(3) AIR DIVISIONS
(a) 313AD(DOI). 1
(b) 314AD(DOF). 2
(c) 327AD
1. DO 1
2. DI 1
(d) 834AD(DO) 2

(4) WINGS
- (a) 8TFW(DCOA). 1
- (b) 12TFW(DCOI) 1
- (c) 35TFW(DCOI) 1
- (d) 37TFW(DCOI) 1
- (e) 56SOW(DXI). 1
- (f) 347TFW(DCOOT) 1
- (g) 355TFW(DCOC). 1
- (h) 366TFW(DCO) 1
- (i) 388TFW(DCO) 1
- (j) 405TFW(DCOA). 1
- (k) 432TRW(DCOI). 1
- (l) 460TRW(DCOI). 1
- (m) 475TFW(DCO) 1
- (n) 633SOW(DCOI). 1
- (o) 1st Test Sq(A). 1

(5) OTHER UNITS
- (a) Task Force ALPHA(DXI) . . . 1
- (b) 504TASG(DO) 1

m. USAFE

(1) HEADQUARTERS
- (a) ODC/OA. 1
- (b) ODC/OTA 1
- (c) OOT 1
- (d) XDC 1

(2) AIR FORCES
- (a) 3AF(ODC). 2
- (b) 16AF(ODC) 2
- (c) 17AF
  - 1. ODC. 1
  - 2. OID. 1

(3) WINGS
- (a) 20TFW(DCOI) 1
- (b) 36TFW(DCOID). 1
- (c) 50TFW(DCO). 1
- (d) 66TRW(DCOIN-T). 1
- (e) 81TFW(DCOI) 1
- (f) 401TFW(DCOI). 1
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FOREWORD

Preceded by two CHECO reports, "Air War in the DMZ, September 1967-June 1969" spans the 1967 summer DMZ enemy offensive (the siege of Con Thien), the 1968 winter-spring offensive (Tet, the siege of Khe Sanh, and the battle of Dai Do), and the subsequent withdrawal of enemy forces from Quang Tri Province. The report examines the control and coordination relationships between Seventh Air Force and the Third Marine Amphibious Force, especially regarding the Forward Bomb Line and several intensified Seek, Locate, Annihilate, Monitor (SLAM) air campaigns. TALLY HO, enemy helicopters in the DMZ, and the Air Force and Marine versions of the antipersonnel sensor systems are also addressed.

[redacted]

AIR WAR IN THE DMZ, SEPTEMBER 1967-JUNE 1969

Introduction

The Geneva Agreement of 1954 established the Demilitarized Zone to separate the People's Army of Vietnam from the Forces of the French Union, until Vietnam could be united. By the mid-1960s, this "demilitarized" area posed decided political problems for the men north and south of the zone. For instance, not until mid-1966, more than a year after the large American troop buildup began, did the North Vietnamese Army (NVA) cross the zone in massive numbers. By the same token, for many months before this NVA invasion, U.S. aircraft attacked north and south of the DMZ, but could not bomb inside the zone.

The Rules of Engagement (ROE) in mid-1969 for American forces illustrate again the singularly sensitive politics of the zone. Five basic and distinct sets of rules governed the area within and bordering that strip of land 37 miles long and four miles wide. In South Vietnam, Allied ground troops and fire support forces ranged where they wished. Inside the southern half of the DMZ, the ROE restricted the United States to air and ground reconnaissance, while airstrikes and artillery struck only "known" enemy targets. North of the Ben Hai River, the DMZ rules permitted airstrikes on enemy positions firing on U.S. aircraft and ground positions. North Vietnam, north of the DMZ, remained strictly off limits except for returning attacks by fire. To the west, the rules in STEEL TIGER East permitted airstrikes on targets of opportunity without FAC control.

The Air Force had a special interest in the DMZ, because the zone lay between the in- and out-country wars. COMUSMACV delegated Seventh Air Force

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the responsibility of controlling operations in Route Package I (RP I) in North Vietnam, while northern I Corps lay within the area of operations of the Third Marine Amphibious Force (III MAF), with headquarters at Da Nang. The DMZ was something of a gray area for command and control responsibilities, especially when the enemy made artillery attacks on the Marines from north of the zone. Such attacks raised the question of where the U.S. ground commander's jurisdiction should lie in stopping such attacks. Consequently, 7AF and III MAF disagreed on several occasions concerning operational responsibilities for particular areas in and around the zone. Examples included the location of the Forward Bomb Line, the control of aircraft in SLAMs in RP I, the single manager of air in-country, and the management of the antipersonnel infiltration system in northwestern I Corps. All these subjects, except single manager, will be discussed in this report in the context of the ground war around the zone.

This report also sketches the VNA failure to overrun northern I Corps, and recounts the enemy troop withdrawals from northern I Corps which permitted the U.S. withdrawal of the 9th Marine Regiment. Operations already covered by CHECO reports--NEUTRALIZE, NIAGARA, and THOR--receive less emphasis than previously undocumented projects such as HAVE FEAR (detection of enemy helicopters in the DMZ), DUMP TRUCK (the Air Force antipersonnel sensor system), and TALLY HO (the intensive interdiction north of the DMZ). Marine usage of sensors along the DMZ is also described.

A number of terms need defining. The DMZ was actually centered around the Provisional Military Demarcation Line, which in the east ran down the Ben Hai

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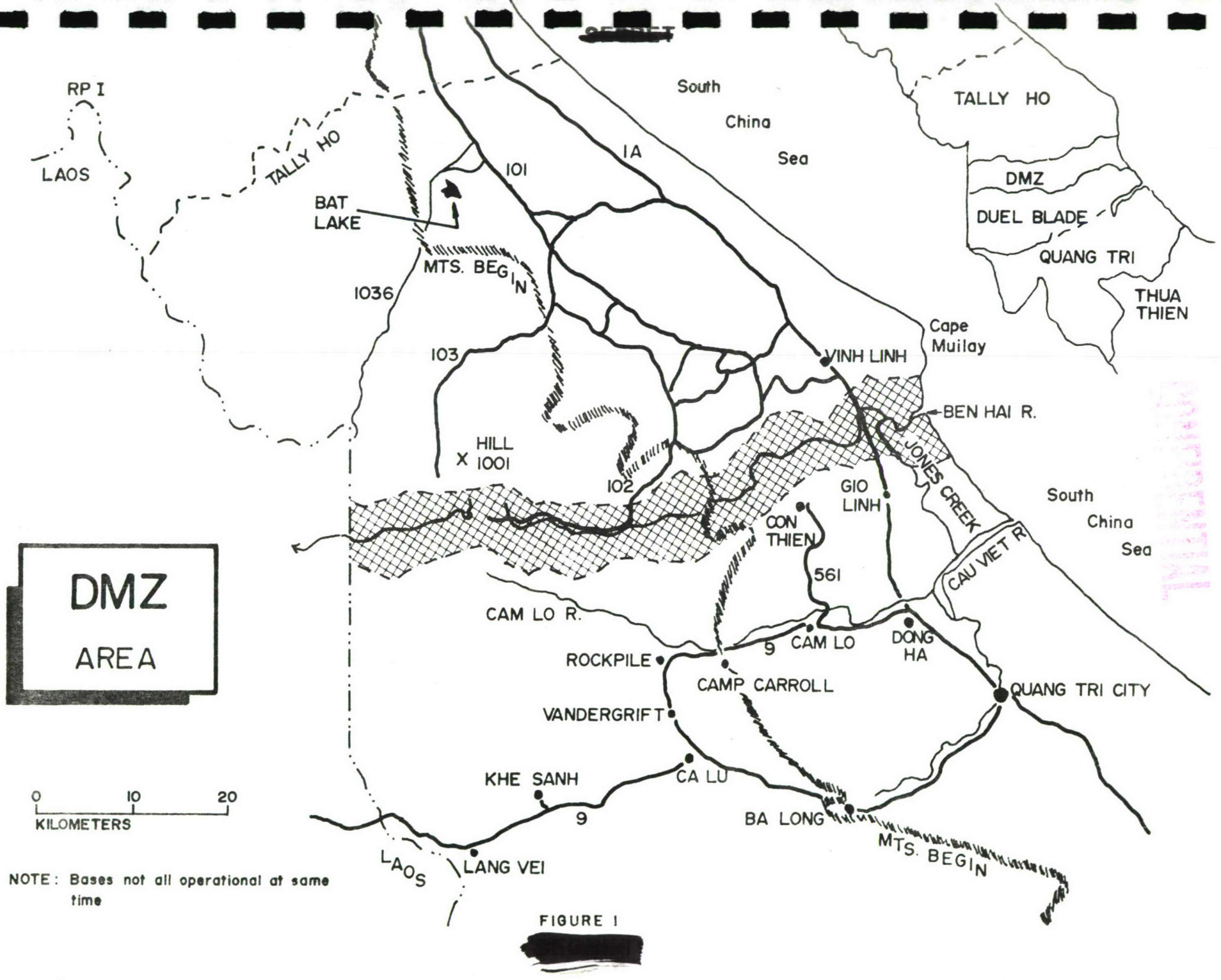
RP I
LAOS
TALLY HO
BAT LAKE
MTS. BEGIN
1036
101
1A
South China Sea
TALLY HO
DMZ
DUEL BLADE
QUANG TRI
THUA THIEN
Cape Muilay
103
VINH LINH
BEN HAI R.
HILL X 1001
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CAMP CARROLL
QUANG TRI CITY
VANDERGRIFT
KHE SANH
CA LU
9
BA LONG
MTS. BEGIN
LAOS
LANG VEI
DMZ
AREA
0 10 20
KILOMETERS
NOTE: Bases not all operational at same time

FIGURE 1

[redacted]

River. In southern RP I, COMUSMACV created a special project and area of intensified interdiction called TALLY HO. South of the DMZ lay the DYE MARKER area, later renamed DUEL BLADE. This latter anti-infiltration project included the area south of the DMZ and north of a line running from Laos along Route 9 to Ca Lu, then straight across to Dong Ha, and then down the Cau Viet River to the sea. Thus, this report concerns the three areas of TALLY HO, the DMZ, and DYE MARKER/DUEL BLADE. (Fig. 1.)

Terrain and Weather

The DMZ delineated no sharp geographical region as did the political separation of North and South Vietnam. From TALLY HO to DYE MARKER/DUEL BLADE, an expanse of sand dunes several kilometers wide stretched along the South China Sea, except for ten kilometers of coast north of the Ben Hai River, where an isolated cluster of hills dropped into the sea around Cap Mui Lay. Behind the sand dunes lay open lowland rice paddies and a network of rivers, streams, and canals. North Vietnamese naval sappers routinely used one such waterway--Jones Creek--to reach the Cau Viet River, and interdict river traffic supplying Dong Ha and Quang Tri City. Rolling hills of brush and scrub ranged west of the paddies, and behind the hills rose rugged mountains with steep slopes, jungle-clogged defiles, and occasional open valleys.

The terrain of eastern lowlands and western mountains had a decided impact on the pattern of U.S. and NVA operations. An intricate network of roads and waterways served the lowlands, but few roads ran west into the mountains. In TALLY HO, the complex road system in the lowlands made air interdiction by road cuts impractical, though the lack of heavy vegetation left trucks exposed to

[redacted]

armed reconnaissance. In eastern DYE MARKER/DUEL BLADE, the lowland terrain favored U.S. Army armor and allowed the Allies to supply by road several forward camps just south of the DMZ.

The western mountains favored the enemy because the heavy jungle cover hid roads and concealed troops. Route 103 in western TALLY HO passed near Hill 1001 into the western DMZ and handled much of the troop infiltration into South Vietnam.[1/] The extension of this infiltration route out of the DMZ into Laos and then southwest along Route 92 was called the Santa Fe Trail. In 1968, the enemy built Route 1036 through virgin mountain jungle from the TALLY HO lowlands southwest to the corner of the DMZ. Seventh Air Force waged an interdiction campaign against the road until the November 1968 bombing halt.

In northwestern DYE MARKER/DUEL BLADE, the enmy had great freedom of movement on the jungle trails, but in moving south, he eventually encountered a line of Allied outposts strung along Route 9: Camp Carroll, Rockpile, Ca Lu, Khe Sanh, and Lang Vei. Much of the fighting in northern Quang Tri centered along that east-west lifeline, until the Marines abandoned some of their static defenses and closed several of these camps in 1968.

The wet season comes to the DMZ from September through January, when 80 of the annual 100 inches of rain fall. In the lowlands, heavy thunderstorms dominate from September through November, turning by December to steady rain and drizzle accompanied by low cloudiness and fog. The foothills and western mountains have even more cloudiness and fog, such as during the famous siege of Khe Sanh in February 1968, when weather greatly hampered airstrikes and airlift

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CONDITIONS OF TERRAIN OF DMZ

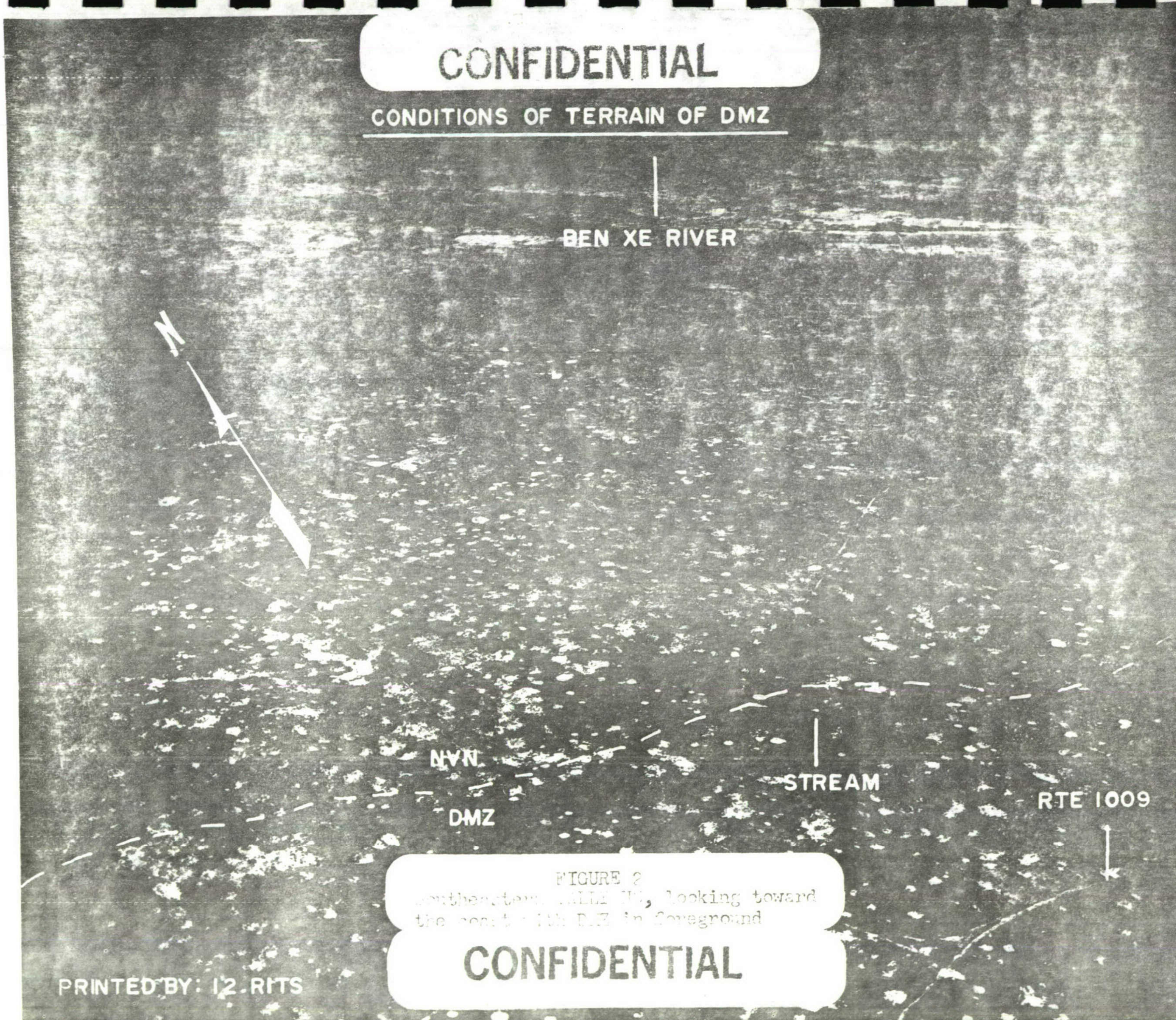

FIGURE 2
[illegible], looking toward the [illegible] in foreground

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supporting the base. From February to August, less than four inches of rain fall monthly in the DMZ region, and by April visibility greatly improves.[2/] Since in Laos the heavy rains come during the summer southwest monsoon, the enemy traditionally turned away from the Ho Chi Minh Trail at that time, and increased his infiltration through the DMZ.[3/] This seasonal shift and good flying weather made TALLY HO a summer battlefield. Consequently, the majority of truck kills (destroyed and damaged by airstrikes) in 1967 and 1968 in TALLY HO occurred from April through October.[4/]

TALLY HO

The NVA used the TALLY HO area to mount heavy artillery attacks on Marine camps in northern Quang Tri and to move supplies to the DMZ for the NVA troops north of Route 9. In April 1968, 7AF estimated one-fourth of the enemy units in Quang Tri received their supplies through the DMZ.[5/] As for the artillery bombardments, they caused such severe damage as to elicit two massive American SLAM operations. Thus, before recounting the battle for northern Quang Tri and its implications for Air Force roles and missions, a brief summary of TALLY HO operations is necessary.

Project TALLY HO grew directly out of the mid-1966 NVA invasion of northern Quang Tri. Using TIGER HOUND in Laos as a model, COMUSMACV created TALLY HO on 17 July 1966. The first airstrike occurred on 20 July. TIGER HOUND had introduced the first Air Force FACs into Laos in December 1965, and created a task force at 7AF headquarters to frag and control airstrikes in the TIGER HOUND area. A forward operating element opened at Da Nang, with the FACs based at Khe Sanh, Dong Ha, and Kham Duc in I Corps and Kontum in II Corps. Since

TALLY HO represented a coordinated campaign managed by a task force and FACs, it was logically joined to the TIGER HOUND operations. The operations section at 7AF was renamed TIGER HOUND/TALLY HO. This union worked well because many of the TIGER HOUND FACs moved to TALLY HO when the wet summer weather closed the Ho Chi Minh Trail. Thus, a minimum number of FACs could remain assigned to each of the areas, while the weight of effort shifted to match enemy activity.[6/]

TALLY HO had both O-2 Covey FACs and F-100F Misty FACs. The former belonged to the TIGER HOUND/TALLY HO operations based at Da Nang, the latter to the 37th Tactical Fighter Wing at Phu Cat. Due to heavy enemy antiaircraft defenses in North Vietnam, the Covey O-2s flew in pairs and were confined to the western mountains in an area designated TALLY HO West. The F-100F program (COMMANDO SABRE) was initiated in June 1967 to put FACs into the high threat areas forbidden to the O-2s. These Misty FACs flew approximately four-to-five hour missions that ranged throughout RP I, including lowland TALLY HO.[7/] Both the Misty and Covey FACs were limited to tours in TALLY HO of 120 days or 75 missions, whichever came first.[8/]

The FACs conducted visual reconnaissance, spotted targets, and controlled aircraft in TALLY HO. Other aircraft performing reconnaissance included the RF-4s and the Army OV-1 Mohawks. The RF-4 provided standard recon film, especially valuable in locating artillery and SAM sites, and sometimes film from sidelooking airborne radar (SLAR). The SLAR film produced much of the intelligence in bad weather conditions by monitoring coastal highways.[9/] The Army OV-1, using SLAR, also flew off the TALLY HO coast. (As a point of additional interest, the operational control exercised by 7AF over the Army Mohawks

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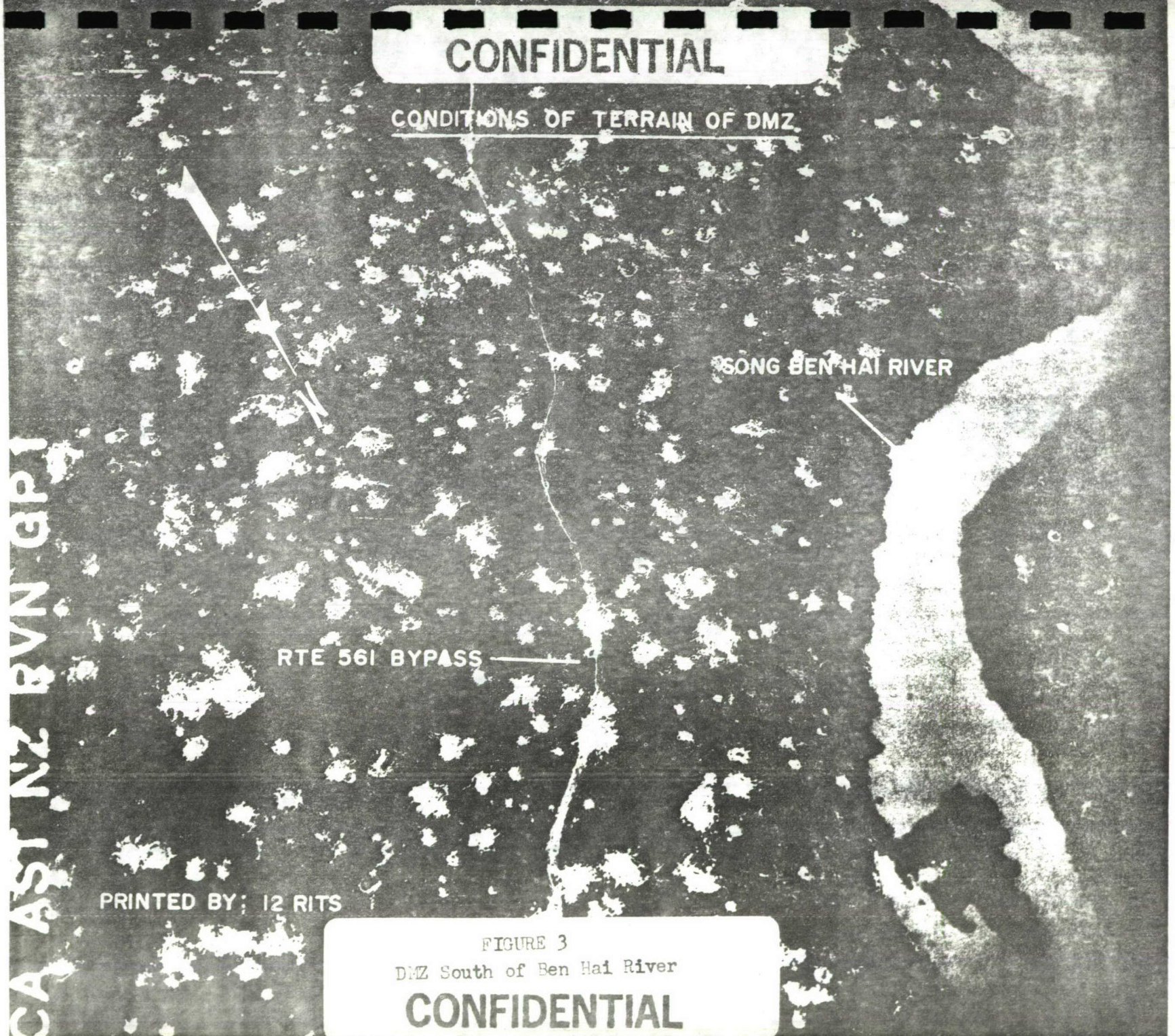

FIGURE 3
DMZ South of Ben Hai River

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CA AST NZ RVN GPJ

on this mission was cited by the 7AF commander as a precedent in the single manager controversy with the Marines.[10/] The enemy could evade SLAR by keeping to western TALLY HO, thereby increasing the distance from SLAR aircraft and using the jungle and intervening mountains for cover.

Three basic types of targets existed in TALLY HO: heavy artillery, logistics targets, and the enemy air defenses. (The heavy artillery will be discussed later in conjunction with SLAMs.) TALLY HO had three standard targets associated with interdiction: lines of communications (LOCs), truck park/storage areas, and vehicles or "movers" (trucks, bulldozers, and watercraft). The third category--defenses--is sometimes classified as a primary interdiction target, because suppressing AAA defenses increases the vulnerability of other targets, and because AAA consumes large amounts of enemy tonnage.[11/] The point may be moot, but the existence of SAMs in TALLY HO seems to argue for a distinct "defense" category.

The campaign against trucks, storage areas, and LOCs was the usual interdiction effort. This campaign of general attrition struck any lucrative target, either by B-52s, by tac air directed by FACs or radar, or by armed reconnaissance. From September 1967 until the November 1968 bombing halt, more than 500 trucks were destroyed or damaged.[12/] Interdiction points could not be closed in eastern TALLY HO, because of the flat terrain and the highly developed route structure, though during the 1968 Summer Interdiction Campaign, several highway ferries and transshipment points received intensive attack.[13/] A scanning of the 7AF "Weekly Air Intelligence Summary" shows that nearly always the LOCs were reported "open and motorable."[14/]

[redacted]

One particular interdiction effort in TALLY HO stands out--the strikes against Route 1036. In late 1967, SLAR revealed heavy truck traffic entering the Bat Lake area. Soon the FACs reported road construction south of the lake, but a combination of heavy cloud cover in the construction area, and the allocation of so many FAC and tac air sorties to the defense of Khe Sanh restricted U.S. countermeasures. By late March, a FAC could report 300 to 400 men working on the new road heading toward the western end of the DMZ.[15] Then 7AF began an interdiction campaign which brought construction to a standstill by July.

Armed recon patrolled the road, while preplanned airstrikes attacked truck parks, storage areas, and road segments, sometimes seeding areas with antipersonnel cluster bomblets. By May 1968, the F-4s were using AGM-12s to block the road with landslides.[16] Through June, the enemy cleared the roads and pushed to within two miles of the DMZ, at which time the FACs estimated that within three weeks, Route 1036 would be west of the mountains.[17] Instead, construction stopped and the road deteriorated along its length. The FACs reported B-52 craters unfilled and the road abandoned except for occasional light foot traffic.[18] However, with the return of cloud cover in late 1968, construction began again and in late March 1969 approximately 12 sorties a day attacked the route that had now crossed into Laos.[19] Though this Ban Nathon route did not yet provide motorable access to the Ho Chi Minh Trail, it did offer several potential connections.

The North Vietnamese defenses in TALLY HO included automatic weapons/antiaircraft weapons (AW/AA), and SAMs. No MIGs attempted intercepts in RP I.[20]

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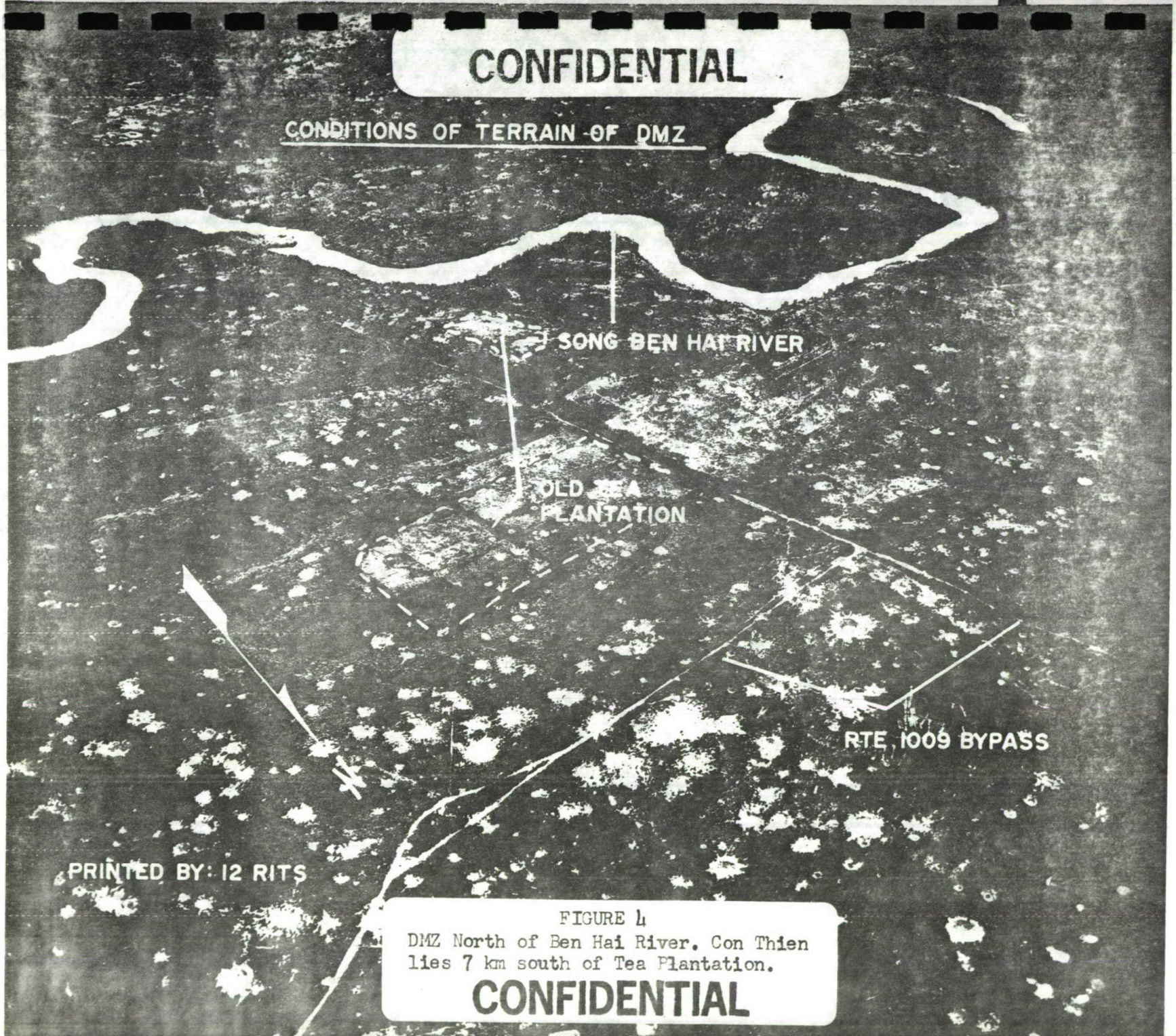

FIGURE 4
DMZ North of Ben Hai River. Con Thien lies 7 km south of Tea Plantation.

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From September 1967 through October 1968, there were 28 Air Force aircraft lost in TALLY HO, though none to SAMs.[21] According to the 7AF Directorate of Intelligence, which made a detailed analysis of RP I defenses, "ground fire was by far the most effective enemy defensive weapons system in RP I."[22]

Seventh Air Force gave SAM suppression in TALLY HO a priority second only to search and rescue and, according to 7AF, "reduced the threat posed by the SA-2 missile system to almost insignificant proportions".[23] Comparing statistics of 1967 with those of 1968 suggests that potentially costly losses would have occurred had not the heavy emphasis been placed on SAM suppression. The first SAM site in the southern panhandle appeared in TALLY HO in March 1967 after a four-day Tet truce. A lack of activity led to the deletion of this site from the active list.[24] On 29-30 April 1967, tac air and naval gunfire destroyed the first confirmed SAM site in the area.[25] However, on 10 May 1967, a Marine A-4 became the first confirmed loss from a SAM in TALLY HO, and 12 days later, a USAF O-1 was shot down by a probable SAM near the DMZ.[26] By the end of May, six SAM sites had been attacked, resulting in two sites destroyed and three damaged. The sixth site was unoccupied when attacked.[27] From 6 July to 17 September, no SAMs were fired; however, on 17 September, an ARC LIGHT mission near the DMZ successfully evaded the first SAMs fired at B-52s. In this instance, the EB-66C (Tiny Tim) gave warning, and the B-52s took evasive action and jammed the SAM tracking and guidance signals.[28]

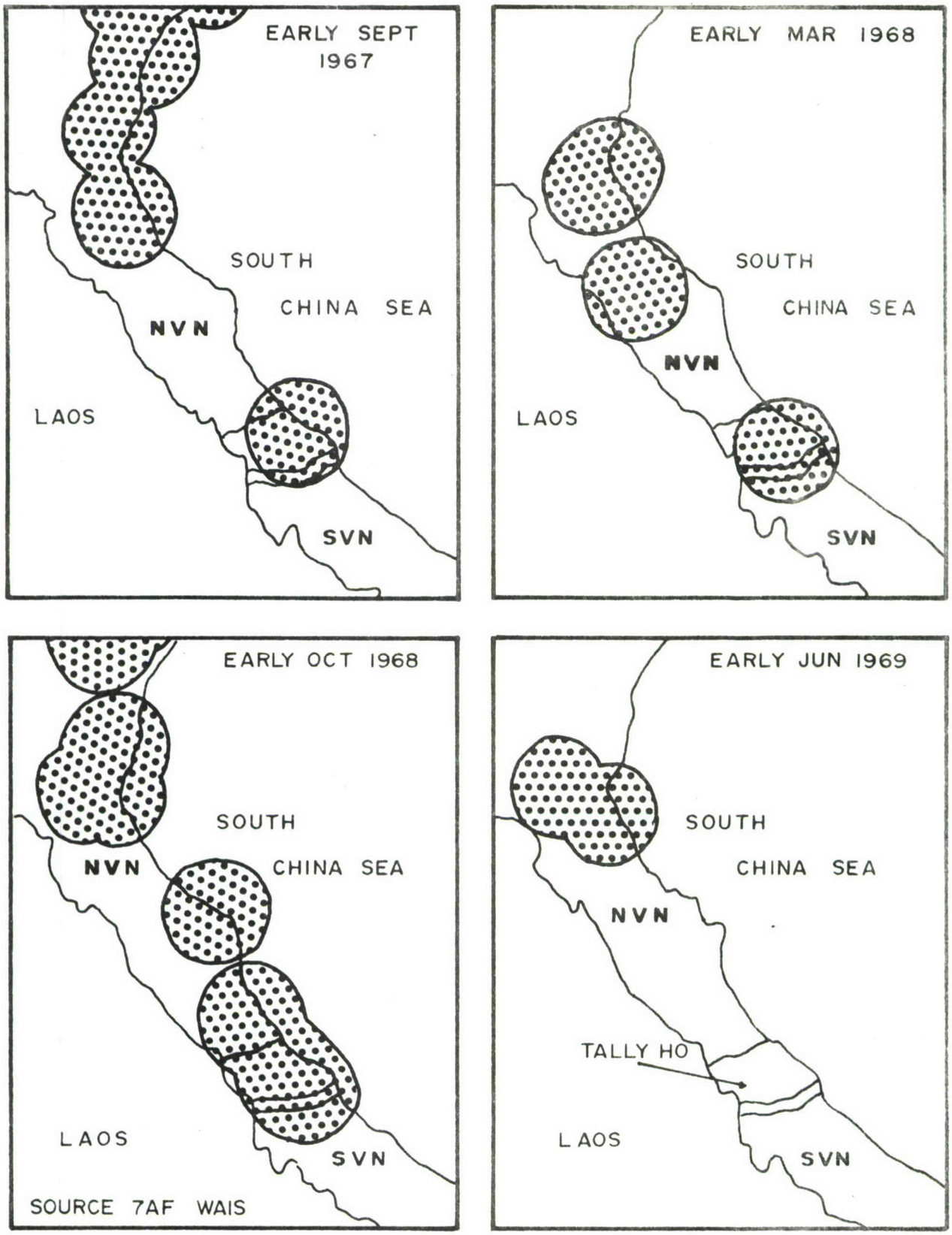
By the end of September 1967, three aircraft had been lost to SAMs in the DMZ area--the third, like the first, was an A-4.[29] Statistics collected by 7AF for the six months before and after 1 April 1968 showed that during the first

six-month period there were 17 SAM firings in all RP I, while the USAF flew 12,157 sorties. During the second six months, there were 18 known SAM firings and 28,194 sorties. During the entire 12 months, not one USAF aircraft was shot down by a SAM in RP I.[30/]

The NVA employed special SAM tactics for the hostile environment of TALLY HO and the remainder of RP I. From April to October 1967--the summer season--the NVA had six SA-2 battalions in the area.[31/] For the same period in 1968, U.S. intelligence located nine prepared positions and "at most" four firing units.[32/] These units normally had only four launchers, rather than the usual six and a reduced need for sophisticated equipment, since they did not need to coordinate their fires with MIGs.[33/] Their mode of operation was to remain dispersed and camouflaged until a few hours before a firing; after a launch, they dispersed just as quickly, if discovered by U.S. aircraft. Of course, 7AF kept a constant vigil to surprise and destroy the SA-2 personnel and equipment in occupied SAM sites. For instance, 54 sorties against one SAM site over several days in mid-June 1968 received credit for destroying or damaging four SAMs, three transporters, and six equipment vans.[34/]

By using mobile tactics, the NVA maintained a harassing capability in TALLY HO and the DMZ, with several reduced strength SA-2 battalions. (Fig. 5.) These SAM units could claim no downed aircraft during the period covered by this report, but they did force 7AF to take extensive countermeasures. In the words of 7AF Intelligence:[35/]

> *"While the SAM defenses did not result in any losses directly, they were not without effect. They diverted*



STATUS OF ESTIMATED ACTIVE SAM COVERAGE IN LOWER NORTH VIETNAM: SEPT 1967-JUN 1969

FIGURE 5

[redacted]

a large number of aircraft from the strike role to the specially equipped and trained IRON HAND role; they were, in part, responsible for reduced armament loads to accommodate the ECM pods on strike aircraft; three aircraft were lost to AA fire while attacking SAM equipment [1 April-31 October 1968]; they raised the requirement for ELINT and jamming aircraft and increased intelligence collection requirements."

Con Thien and the Forward Bomb Line

In the summer of 1967, the North Vietnamese still hoped to conquer the South, and they saw Quang Tri as a first and most accessible step. A year later, the battle for northern Quang Tri was over and the NVA were in retreat from the province. Together with the Tet Offensive, the North Vietnamese' dream of military victory died at Con Thien and Khe Sanh. Thereafter, the enemy's goal became political victory, to win by illusion what could not be taken by force. In this new strategy, Saigon became the lucrative target and Quang Tri fell heir to quieter days. Next, the November bombing halt made it mandatory to the Allies that the DMZ could no longer be a major staging area for attacks on the South. The NVA generally conformed to this understanding. Thus, by mid-1969 the U.S. could take the first steps toward withdrawing from Quang Tri.

The earlier concentration of forces on both sides had been a long time coming. The NVA had made a secret "declaration of war" of sorts in May 1959 by organizing the 559th Transportation Group to handle the infiltration into the South.[36/] Border-crossing teams carried medicines, ammunition, food, and documents through the demilitarized zone. However, not until mid-1966 did sizable NVA combat forces cross as units through the center of the zone and attempt to overrun Quang Tri. Defeated at that time by Operation HASTINGS,

[redacted]

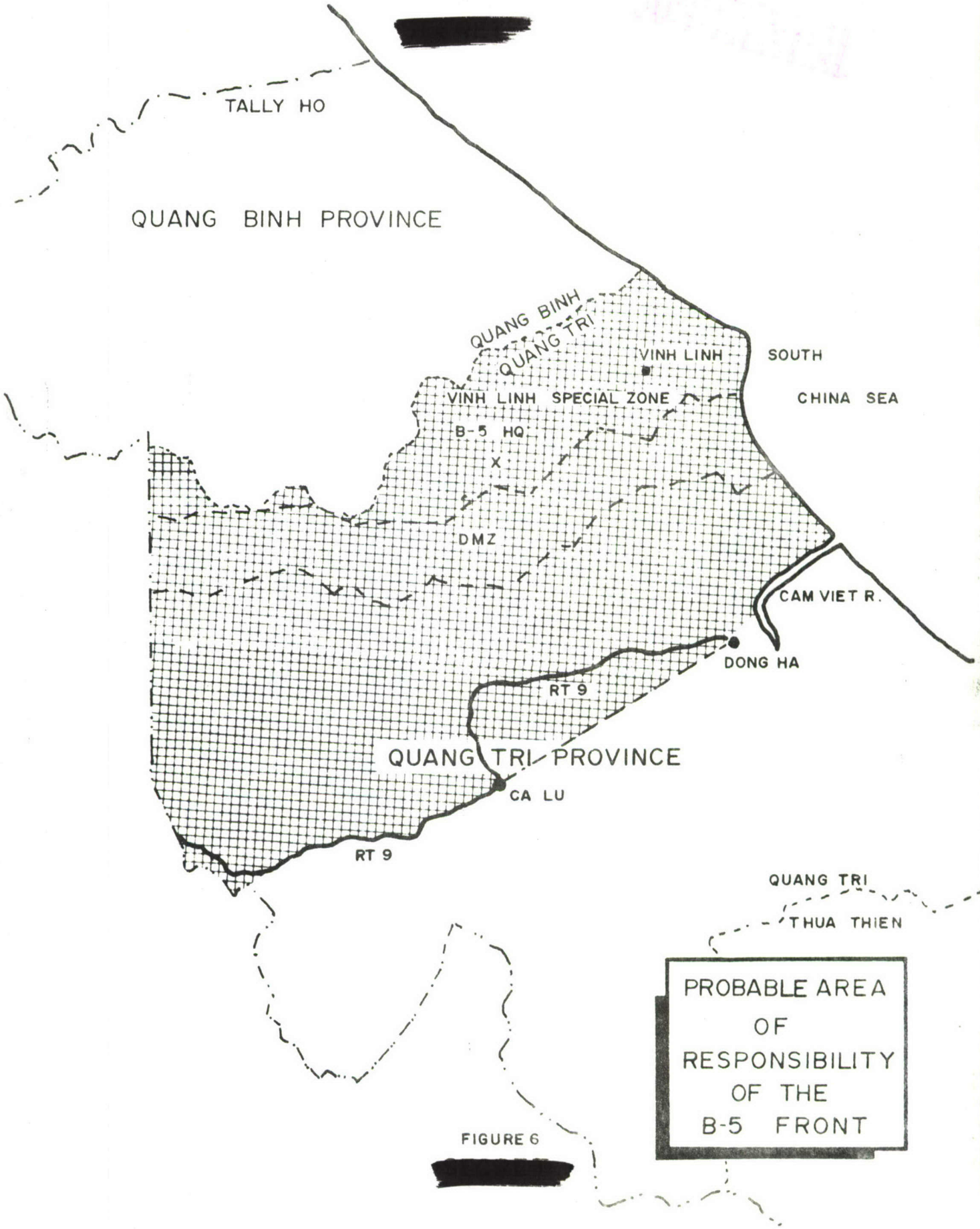
the enemy in the spring and summer of 1967 mounted another major and sustained invasion, one controlled by the newly formed DMZ Front or B-5 Front. Directly subordinate to the NVA headquarters in Hanoi, rather than to the Viet Cong's Central Office, South Vietnam (COSVN), the B-5 Front spanned parts of North and South Vietnam, thus exposing the enemy's disregard for the Geneva Agreement.[37] (Fig. 6.)

The U.S. countered the growing enemy strength by moving the 3d Marine Division to northern Quang Tri. Its forward operations headquarters settled at Dong Ha. Units of the division first entered the province in July 1966 to implement HASTINGS. They made Khe Sanh a Marine base and built Camp Carroll as the main staging base near the DMZ.[38] In April 1967, the division assumed control of Ca Lu and Ba Long from the ARVN.[39] In HICKORY (17-28 May), the division conducted the first overt American ground operation in the DMZ.[40]

No sooner had U.S. troops entered the zone than command and control problems arose between III MAF and 7AF. The planning and coordination mixups plaguing HICKORY, such as the Marine amphibious force not having air cover when landing, have already been documented by a CHECO report. Just before the operation began, COMUSMACV moved the Forward Bomb Line (FBL) from the southern edge of the DMZ up to the northern border of the zone.[41]

Just what command and control implications the FBL had was open to varying opinions, especially since there was also something called a Fire Support Coordination Line. The JCS definitions were:[42]

"Forward Bomb Line: Lines prescribed by a troop commander


[redacted]
TALLY HO
QUANG BINH PROVINCE
QUANG BINH
QUANG TRI
VINH LINH
SOUTH
CHINA SEA
VINH LINH SPECIAL ZONE
B-5 HQ
X
DMZ
CAM VIET R.
DONG HA
RT 9
QUANG TRI PROVINCE
CA LU
RT 9
QUANG TRI
THUA THIEN
PROBABLE AREA OF RESPONSIBILITY OF THE B-5 FRONT
FIGURE 6
[redacted]

beyond which he considers that bombing need not be coordinated with his own forces.

"Fire Support Coordination Line: A line established by the appropriate ground commander to insure coordination of fire not under his control but which may affect current tactical operations. The fire support coordination line should follow well-defined terrain features. The establishment of the fire support coordination line is normally coordinated with the appropriate tactical air commander and other supporting elements."

These definitions mention only coordinating fire support and do not state whether the ground or air commander controls the airstrikes and artillery fire beyond the FBL and FSCL. In actual practice around the DMZ, COMUSMACV made the FBL the boundary between the areas of operation of 7AF in North Vietnam and III MAF in South Vietnam.

By moving the FBL north, COMUSMACV made III MAF responsible for coordinating air, artillery, and naval gunfire in the DMZ. (Fig. 7.) This coordination was done by the Marine Direct Air Support Center (DASC) Land Shark Bravo at Dong Ha, and its collocated Fire Support Coordination Center (FSCC). Coordination north of the zone remained with the Air Force Control and Reporting Post (CRP) at Dong Ha called Waterboy, and the Airborne Battlefield Command and Control Center (ABCCC) orbiting to control TIGER HOUND/TALLY HO and called Hillsboro.

Seventh Air Force had agreed to extend the FBL only for the duration of HICKORY, but the line did not revert south with the end of the operation.[43/] In early July, III MAF requested 7AF provide a minimum of 75 daily sorties north of the DMZ to help the Marines counter the growing enemy attacks by fire on northern Quang Tri bases.[44/] The III MAF request explained the situation:

"Despite efforts with present resources, arty/ NGF and air, to neutralize enemy fires, heavy enemy arty/rocket and mortars continue to fall on Gio Linh, Con Thien, Dong Ha and Marine maneuver elements in the Buffalo area in vicinity of DMZ. Believe NVA weapons, particularly artillery, are in dispersed, camouflaged and heavily overheaded bunkers which are relatively impervious to anything short of heavy delayed-fuze bombs."

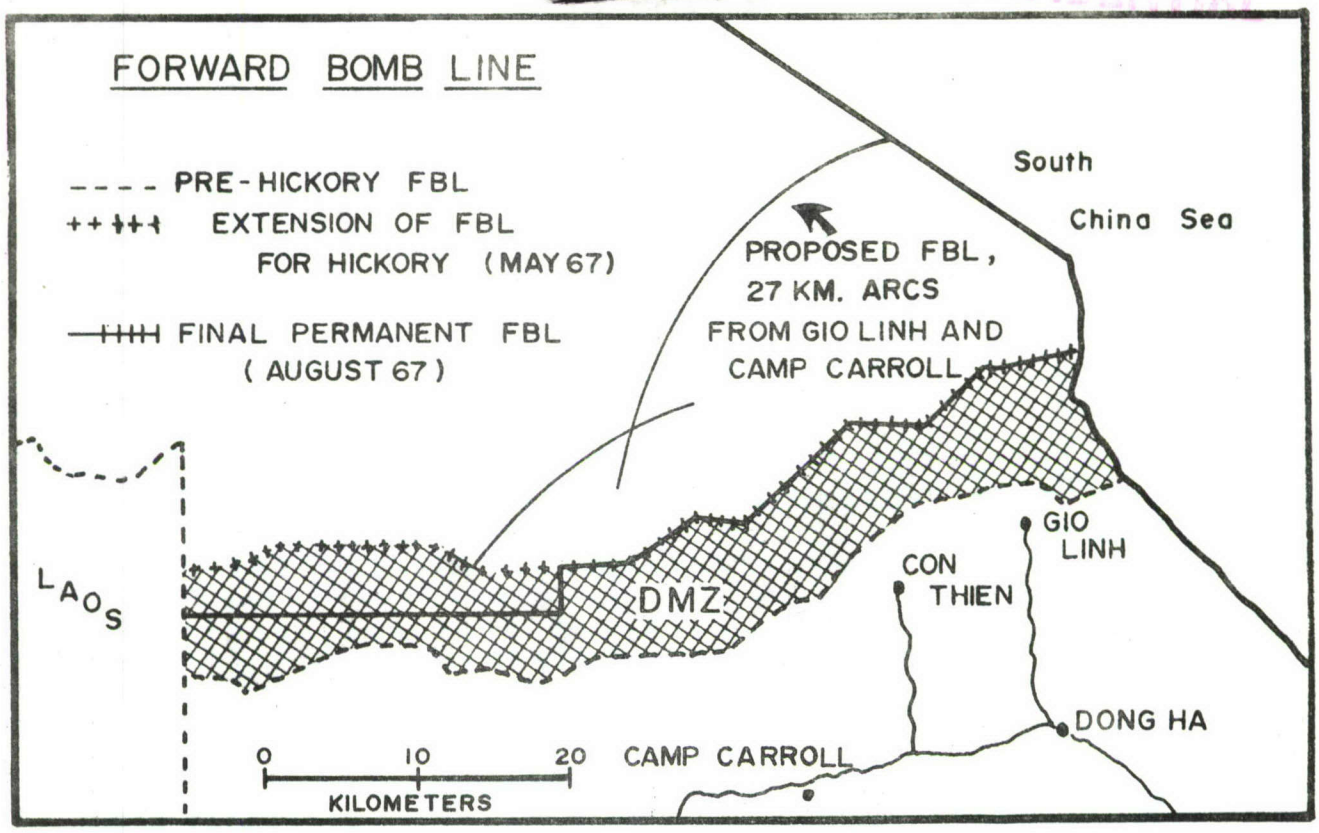
According to the III MAF proposal, the First Marine Air Wing (1st MAW) would "concentrate effort in the DMZ" and "make maximum effort in this area even at expense of other support in I CTZ."[45/]

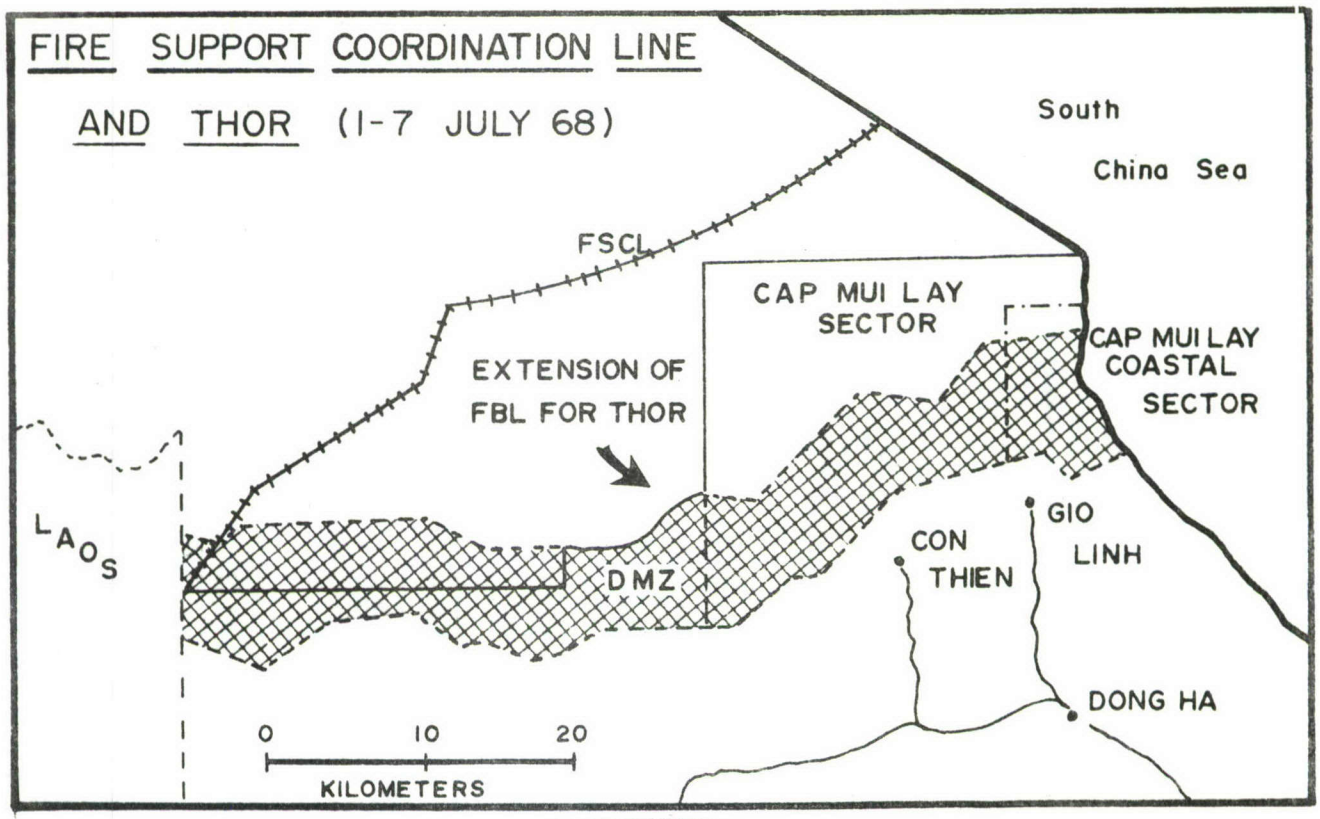
Four days later, 7AF made the following comment to COMUSMACV:[46/]

"The need for intensified effort against enemy positions in and north of the DMZ ... reemphasizes need for resolving the FBL problem in the manner requested by 7AF. Specifically the FBL should not be considered static but should be as close to friendly forces as safety permits. This would permit most effective application of both Marine and 7AF air resources against targets in vicinity of DMZ with coordination and control accomplished by means of established and proven procedures."

Seventh Air Force wanted the FBL returned to the pre-HICKORY location.

In response, III MAF again noted that the most significant enemy threat in I Corps lay along the DMZ, and that the ground commander was best informed which of the enemy fire positions threatened I Corps. The forces available to III MAF to strike into and across the DMZ included assigned air, artillery, and supporting naval gunfire. Further, III MAF had a coordination system that could work jointly with 7AF "in any area", and a Marine radar bombing system that could control night/all-weather strikes up to 30 miles north of the DMZ. Therefore, III MAF proposed running the FBL from the South China Sea along 27





FIRE CONTROL COORDINATION LINES

FIGURE 7

kilometer arcs from Gio Linh and Camp Carroll, the range of the enemy 130-mm guns.[47] (Fig. 7.)

Neither the III MAF nor 7AF proposal was accepted though the west portion of the FBL was moved back to the Provisional Military Demarcation Line. MACV Change 2, Directive 95-4, 26 August 1967, formalized the new FBL.

While the U.S. commands wrestled with control and coordination problems, the enemy attacks by fire increased sharply. In February 1967, less than one thousand rounds were fired at forward Marine positions; in July, the total reached more than six thousand. More specifically, in May and June, Dong Ha, Gio Linh, and Con Thien received 2,473 reported rounds of all types. In July and August, the total climbed to 4,428. In the first three days of September alone, it reached a thousand. These attacks by fire severely disrupted Marine operations and caused significant casualties. On 3 September, most of the Dong Ha ammunition and fuel dump burned and 77 personnel were wounded.[48] By using fire attacks, the enemy substituted artillery, rockets, and mortars for the large units of his 1966 invasion campaign. According to the 7AF DI, enemy troops seemed to avoid battle, perhaps to draw U.S. forces away from hardened positions.[49]

In September, the battle in northeastern Quang Tri reached its peak with nearly 7,500 rounds falling on forward Marine positions; 1,200 rounds fell on 25 September alone. Enemy battalions penetrated "Leatherneck Square"--the area around Gio Linh, Con Thien, Cam Lo, and Dong Ha--and set a battalion-sized ambush on Route 9. Con Thien was nearly surrounded.[50]

In response, the U.S. intensified reconnaissance and airstrikes against enemy positions. Seventh Air Force launched a SLAM called NEUTRALIZE that ran from 12 September through 31 October in southern TALLY HO. Strike totals included 1,436 Air Force, 1,584 Marine, 65 Navy tac air and 820 ARC LIGHT sorties.[51] Locating and destroying hardened artillery sites was extremely difficult, especially when the enemy employed camouflage, dispersion, day firing, and constant redeployment among prepared positions. Additionally, U.S. efforts suffered because the O-1 and O-2 could not survive easily in eastern TALLY HO, and the F-100 FACs had difficulty spotting artillery.[52] A special NEUTRALIZE task force was established to exploit photo reconnaissance, the backbone of the target generation process. The NEUTRALIZE BDA included 132 field artillery positions and 66 AAA positions destroyed or damaged, along with other sizable losses inflicted on the enemy. As pointed out by the CHECO report on the operation, airpower was the one U.S. advantage in this artillery duel across the DMZ.[53]

Since NEUTRALIZE lay north of the FBL, coordination and control lay indisputably with 7AF. Problems did occur, however, especially with Marine artillery firing into the DMZ and TALLY HO. In the latter area, the ABCCC established checkfires on Marine artillery and the Marines reported excessive holding periods. Air Force personnel, on the other hand, reported difficulty getting aircraft into some areas, due to friendly artillery firing into the DMZ. The 7AF commander visited Dong Ha and arranged for an Air Force liaison team to be collocated with the Marine FSCC. This was the precursor of Jazzy Control that coordinated Marine artillery in Air Force areas of operation.[54]

In October, only 3,600 rounds impacted on forward Marine positions, versus 7,400 rounds the month before.[55/] The siege of Con Thien was over. A combination of the intensified U.S. firepower, and the coming of the rainy season finally suppressed the enemy attacks. The Combined Intelligence Center, Vietnam (CICV) made this conclusion in a study on the siege of Con Thien done at the request of the Defense Intelligence Agency (DIA).[56/] Further, in the opinion of the 7AF DI, "the early and sustained truck attrition and associated supply destruction by Seventh Air Force strikes north of the DMZ was the important factor in the outcome of the siege of Con Thien in September 1967". The Air Force reportedly destroyed more than 2,300 trucks in RP I from May through August 1967.[57/]

Although coordination problems in NEUTRALIZE were less than those in HICKORY, the Marines still sought control over parts of southern TALLY HO. On 6 November, MACV held a conference at III MAF headquarters to coordinate the defense of the DMZ. Fifteen generals attended, including the 7AF DO. At the conference, the Marines pointed to the failure of the Cap Lay Operation as proof that the status quo of fire coordination and planning did not work in TALLY HO.

The Cap Lay Operation had been III MAF's idea for an attack on 100 targets in the southeast corner of TALLY HO in the space of 24 hours. Seventh Air Force was not privy to the original plans and first learned of the project on 29 August, when III MAF requested a joint air/artillery/naval gunfire operation against the coastal guns of Cape Mui Lay. MACV approved without coordination with 7AF, though on Air Force urging, MACV did eventually assign control

of the operation to 7AF. Thereupon, III MAF forwarded a target list but no strike priorities or requested times over target.[58/]

Lacking specific details beyond what the Marine liaison officer could supply at 7AF headquarters, Air Force personnel assumed the participants in the field had more detailed information. The TALLY HO controller-Hillsboro ABCCC--had little information about the operation beyond a list of targets, the area, and duration of the operation, and the fact that spotter and strike aircraft would be available. The ABCCC did not know who would hit which targets at what times. The resulting uncoordinated attack was described by the ABCCC commander:[59/]

> *"As a result of this lack of planning the following events took place: The ships had no idea of what target to hit and requested target selection from Hillsboro. No fragged times were available for spotter or strike aircraft; they merely arrived. Neither spotter nor strike aircraft were in receipt of fragged targets, nor were they aware of the fact that they were to be under the control of Hillsboro. Land Shark Bravo was totally unaware that the exercise was even scheduled to take place. Although there were difficulties generated by lack of planning by III MAF and apparent lack of coordination with 7AF, four hours after the exercise started, Hillsboro was able to establish a smoothly functioning operations of coordinated and spotter-controlled NGF and air strikes on any given target deemed lucrative by the spotter. This entailed NGF on a given target until the strike aircraft arrived for flak suppression purposes, lifting of the NGF, expending of ordnance by the strike flight, VR of the target for BDA and determination if additional NGF or ordnance was required, renewal of the NGF if required once the spotter was clear of the area, or selection of a new target if required."*

The 7AF participants came away from the III MAF/MACV coordination conference believing the Marines would reopen the FBL question and use the Cap Lay experience as justification for placing the FBL 35,000 yards north of

Quang Tri deep in TALLY HO.[60] MACV convened a special meeting a week later to settle the coordination controversy. The solution left the FBL unchanged, but established a Fire Support Coordination Line (FSCL) north of the FBL. (Fig. 7.) In the words of the 7AF DO:[61]

> *"...the FSC Line in no way divests ABCCC or 7AF of any authority for control and coordination of air and artillery fires in TALLY HO. Instead it is a formal recognition that III MAF has the right to ask for help and information from 7AF and the ABCCC about targets south of the FSC Line."*

In short, III MAF would receive from 7AF the available reconnaissance and BDA information concerning the enemy threat, particularly guns, south of the FSCL.

MACV Directive 95-1 formalized the procedures two months later. The crux of the matter was concisely expressed:[62]

> *"To facilitate the most effective employment of air, artillery and naval gunfires, 7th Air Force will authorize III MAF to engage targets by artillery and naval gunfire out to the FSCL, except when specific airspace north of the DMZ is required by 7th Air Force ABCCC for air operations. When specific airspace is required for air operations the 7th Air Force ABCCC will suspend III MAF authority to fire in such area(s) through the FSCC at Dong Ha to halt artillery and naval gunfire for the minimum time and in minimum airspace necessary for execution of the required air missions."*

To insure Air Force/Marine coordination, 7AF placed a permanent liaison team called Jazzy Control at the FSCC at Dong Ha, and gave Jazzy 24-hour radio contact with the ABCCC.[63] These several procedures only temporarily assuaged the Marine grievances. When the NVA attacks by fire from north of the DMZ

increased sharply the next summer, III MAF sought to have the FBL extended north to the FSCL. (See Section on "THOR and the FBL".)

Another facet of the control of airspace north of the DMZ arose over the contingency plan for DURANGO CITY. In this highly classified operation, III MAF used its authorization received from MACV for DURANGO CITY to designate the Commanding General, 1st Marine Air Wing, as its tactical air commander. The 7AF Commander demurred. He cited joint Army/Air Force doctrine, MACV directives, and the experiences of previous wars to show that a single tactical air commander should exist and that he, the 7AF commander in his role as Deputy COMUSMACV for Air, should be that man. COMUSMACV agreed and directed such a modification in the DURANGO CITY plan. As it turned out, DURANGO CITY was only a footnote to the war, a plan never implemented.[64/]

Anti-Infiltration Barrier

While the U.S. only contemplated invading the North, the NVA relentlessly poured troops and supplies into the South. To stem this flood, the U.S. began an anti-infiltration barrier across northern Quang Tri and the Ho Chi Minh Trail. In Vietnam, early proposals included a barrier from Saigon west to Cambodia, and a barrier near the DMZ from the South China Sea to Thailand.[65/] CINCPAC consistently opposed a conventional barrier, because it tied American troops to static defenses, while allowing mobility to the enemy.[66/] However, the Secretary of Defense decided on an anti-infiltration barrier of strong points along the eastern DMZ, and air delivered sensors and munitions in the west. The total system with three subsystems would be operational in October 1967.[67/] The sections from east to west were the Strong Point Obstacle Subsystem (DYE MARKER),

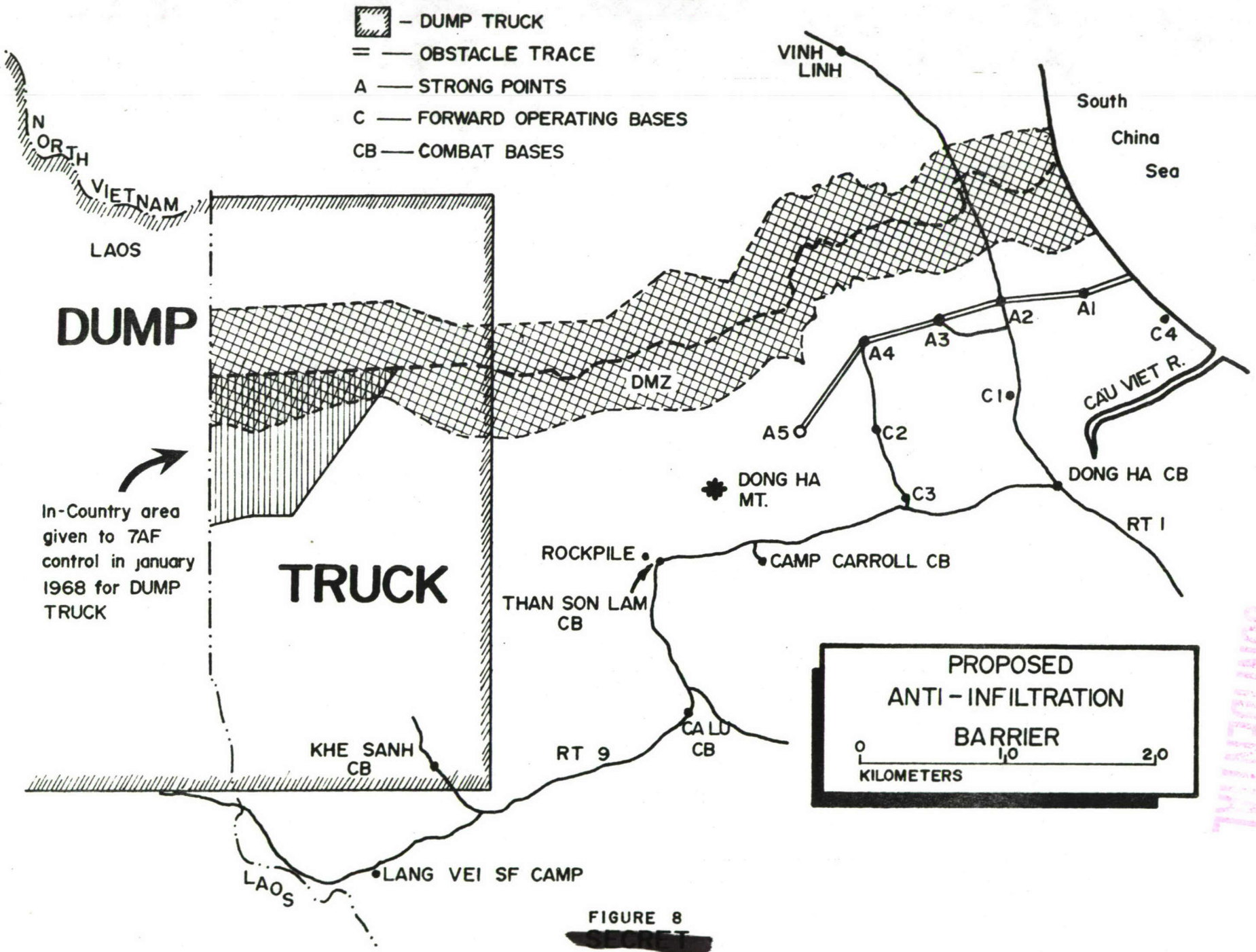


FIGURE 8

and the Air Force's Antipersonnel Subsystem (DUMP TRUCK) and Antivehicular Subsystem (MUD RIVER). Only DYE MARKER and DUMP TRUCK applied to the DMZ.

A cleared obstacle line would run 23 kilometers from the sea to the western foothills. Barbed wire, mines, personnel sensors, and five "strong points" would line this cleared trace, backed by four support bases. Figure 8 locates the five Alpha sites and four Charlie bases. COMUSMACV defined a strong point as:[68/]

> *"...virtually an impregnable defensive position. It must be sited, constructed and organized in such a professional manner that one ARVN battalion, with appropriate combat support, can standoff one NVA division."*

This emphasis on having ARVN at the barrier was in line with COMUSMACV's statement to the National Press Club in Washington on 23 November 1967 that the ARVN would assume a major share of the defense of the DMZ in 1968.[69/]

Initially, the barrier was to detect enemy movement by a Balanced Pressure System of buried tubes similar to highway counter cables.[70/] This was augmented with hand emplaced seismic and acoustic sensors. Once the enemy pressure on Con Thien slackened, the 3d Marine Division (MarDiv) began building the barrier and strengthening the strong points such as Con Thien (A-4) and Gio Linh (A-2). By November, the division's command chronology reported the division "oriented to provide maximum support to DYE MARKER". A special division school was opened to train surveillance teams to use night observation devices (NOD) and plant sensors. Engineers cleared sections of the trace and built roads, bunkers, and thousands of meters of fence. This maximum emphasis on DYE MARKER ended

abruptly in late January with the siege of Khe Sanh and the Tet Offensive. Only scattered parts of the barrier were completed.[71/]

While the Marines worked on DYE MARKER, the Air Force made preparations for initial operations in DUMP TRUCK. This operation, whose eastern area is shown in Figure 8, was the weakest link in the chain of three subsystems. Detecting troops moving along narrow jungle trails was far more difficult than finding trucks on Laotian roads, or monitoring enemy movements in the open lowlands of eastern Quang Tri. As conceived in the fall of 1967, DUMP TRUCK had three main components: (1) seismic, acoustic, and magnetic sensors to locate troops and air emplaced button-bomblets designed to explode underfoot and activate acoustic sensors; (2) EC-121s to relay the sensor signals; and (3) the Infiltration Surveillance Center (ISC) at Nakhon Phanom to analyze the data and identify targets.[72/] Mine fields would be laid to block or channel infiltration. The planners had reservations about the antipersonnel subsystem having much effect on the enemy in view of the inherent difficulty of visually spotting and attacking men under tropical canopy. The operations orders recognized that:[73/]

> *"Slowing or stopping troops walking through the country by air alone is a more difficult and complex problem. The aim of the antipersonnel operations will be to reduce and slow infiltration, inflict casualties, force infiltrators into more difficult terrain, and demoralize porters and troops."*

Lt. Gen. Alfred Starbird, in charge of the overall DOD planning for the anti-infiltration system, noted to the 7AF commander that tests in Florida and Panama revealed that FACs given the location of sensor-located infiltrating

troops could not spot them to initiate strikes. "Rather, strikes had to be made on the basis of sensor signal alone if any success was to be achieved. A similar situation is expected to apply in DUMP TRUCK".[74/] Significantly, even in January 1968, 7AF was talking not about implementing DUMP TRUCK but about beginning the operational test, suggesting again the lack of optimism over the antipersonnel system.[75/]

The establishment of DUMP TRUCK entailed complex technical and political coordinations. Ground surveillance teams were planned for DUMP TRUCK to observe trail activity and plant sensors in both Laos and South Vietnam. Hand emplacing sensors provided known sensor locations (to the extent of map accuracy). These "Spike Teams" of Americans and Vietnamese were infiltrated and extracted by helicopter with FACs present at both operations. Coordination among 7AF, MACV, and the U.S. embassies at Bangkok and Vientiane were lengthy and complex.[76/]

Unlike the ROEs for Spike Teams, the 7AF/III MAF overlap of authority in northern Quang Tri has not been formally resolved to date, though actually 7AF has not implemented DUMP TRUCK. A glance at Figure 8 shows a gap between the strong point barrier and the eastern boundary of DUMP TRUCK. Although strong point Alpha 5 was never built, the original barrier was to run to the foothills near Dong Ha Mountain. West of there, III MAF and MACV talked of "defiles" through the mountains and the need for a portion of DYE MARKER to be tailored to the area. A December 1967 plan on DYE MARKER published by MACV defined the III MAF Defile System as running from Route 9 north to the DMZ and west from Alpha 5 to the Laotian border. Battalion base camps along Route 9 would anchor ground operations to the north: sensors would greatly aid in locating

infiltration routes. Additionally, at the end of 1967, the division of authority between III MAF and 7AF remained decidedly unclear in the overlapping area of the Defile System and DUMP TRUCK.[77]

In late December, 7AF requested of III MAF "that 7AF be cleared to conduct unrestricted air operations under control of the ABCCC" in the overlap area except around Khe Sanh. The ABCCC would "limit artillery fires through the fire support center for minimum time periods when orbit, strike, mission aircraft or ground teams would be jeopardized by artillery". Also, the ABCCC would request artillery fire on sensor-located targets when "artillery is considered most advantageous...." Marine control of any areas within the South Vietnamese portion of DUMP TRUCK would be reestablished by giving 7AF 48 hours routine notice or one hour emergency notice.[78]

To this request, III MAF said, "No." The Marines were directly responsible for "the anti-main force war" along the DMZ and Laos and could not surrender control of the area in question. Further, the present coordination procedures between the ABCCC and the FSCC at Dong Ha worked and would continue to work well.[79]

Seventh Air Force thought these were "complex coordination procedures which would impair operations of both commanders". Consequently, 7AF outlined to MACV a proposal to implement the Laotian part of DUMP TRUCK on 20 January and to maintain a capability to extend it into South Vietnam if MACV desired that.[80] This reflected 7AF's intention to concentrate DUMP TRUCK on infiltration from the west end of the DMZ down the Santa Fe Trail. COMUSMACV quickly responded by giving 7AF "primary control...for the purposes of controlling and managing

DUMP TRUCK activities" in the extreme northwest corner of Quang Tri where the Marines hardly, if ever, entered. (Fig. 8.) This in-country portion equalled perhaps one-sixth of the overlap area in question.[81]

DUMP TRUCK and Khe Sanh

In assigning this small corner to 7AF, COMUSMACV stressed the possible need for sensors around Khe Sanh to monitor an increasing enemy threat. On 19 January 1968, he ordered the diversion of DUMP TRUCK assets to the trails and roads approaching the combat base. On 20 January, the siege began with the first mortar and rocket attack. On 21 and 22 January, a total of 104 sensors went in, of which 75 worked. On 25 January, Khe Sanh received the first message or Spotlight Report on sensor-located targets.[82]

In these few days, the IGLOO WHITE sensors became operational as a battlefield surveillance system, rather than an infiltration monitoring system. It remained so for many months until the threat around Khe Sanh lessened. Figure 9 shows just how densely the sensors clustered around Khe Sanh rather than in Laos. The eventual success of the sensors at the combat base attracted wide interest in the use of sensors and in April and May 1968 brought the birth of several projects, such as seeding enemy Base Area 101 and monitoring truck traffic in the A Shau Valley.[83] Seventh Air Force foresaw this possible dissipation of resources into many small projects and took precautions to conserve the sensor assets.[84] In September, 7AF, suspended indefinitely the testing of the antipersonnel system and allocated all assets to the antivehicle role for the upcoming COMMANDO HUNT.[85] Thus, the antipersonnel subsystem, like the strong point obstacle subsystem to the east, was postponed under the impact of

Tet/Khe Sanh and never fully implemented when those crises passed.

Much knowledge came out of Khe Sanh, however, about the use of sensors in an antipersonnel role. Most importantly, the air-delivered sensors proved their value beyond any doubt, and eventually, the Marines stopped attacking the single sensor-generated targets. There were, of course, several problems as individual sensors did not provide good specific target accuracy. Although the Marines received target locations to a grid position of plus or minus five meters the targeting officer at Khe Sanh learned the sensor locations were known within only 200 meters on the average. Accordingly, the Marines could not be certain about the specific accuracy of Spotlight Reports. Other weaknesses were false alarms from artillery and aircraft, delays in getting the sensor reports to Khe Sanh, and the inaccurate positioning of sensor strings. In the latter case, because heavy foliage hid the exact trail locations, and because many areas had a web of interconnecting trails, many of the strings were placed perpendicular to the suspected trails to cut across the foot traffic at some point. However, by not being parallel to the trail, the sensor strings could not provide good data on speed or direction of personnel movement.[86/]

While of limited value for individual targets, the air-delivered sensors provided spectacular assistance against target complexes and massed troops. To attack, the enemy had to concentrate forces and supplies and, in doing so, he set off heavy area sensor activity. These massed concentrations made inviting targets to air and artillery. The Khe Sanh target officer described an example:[87/]

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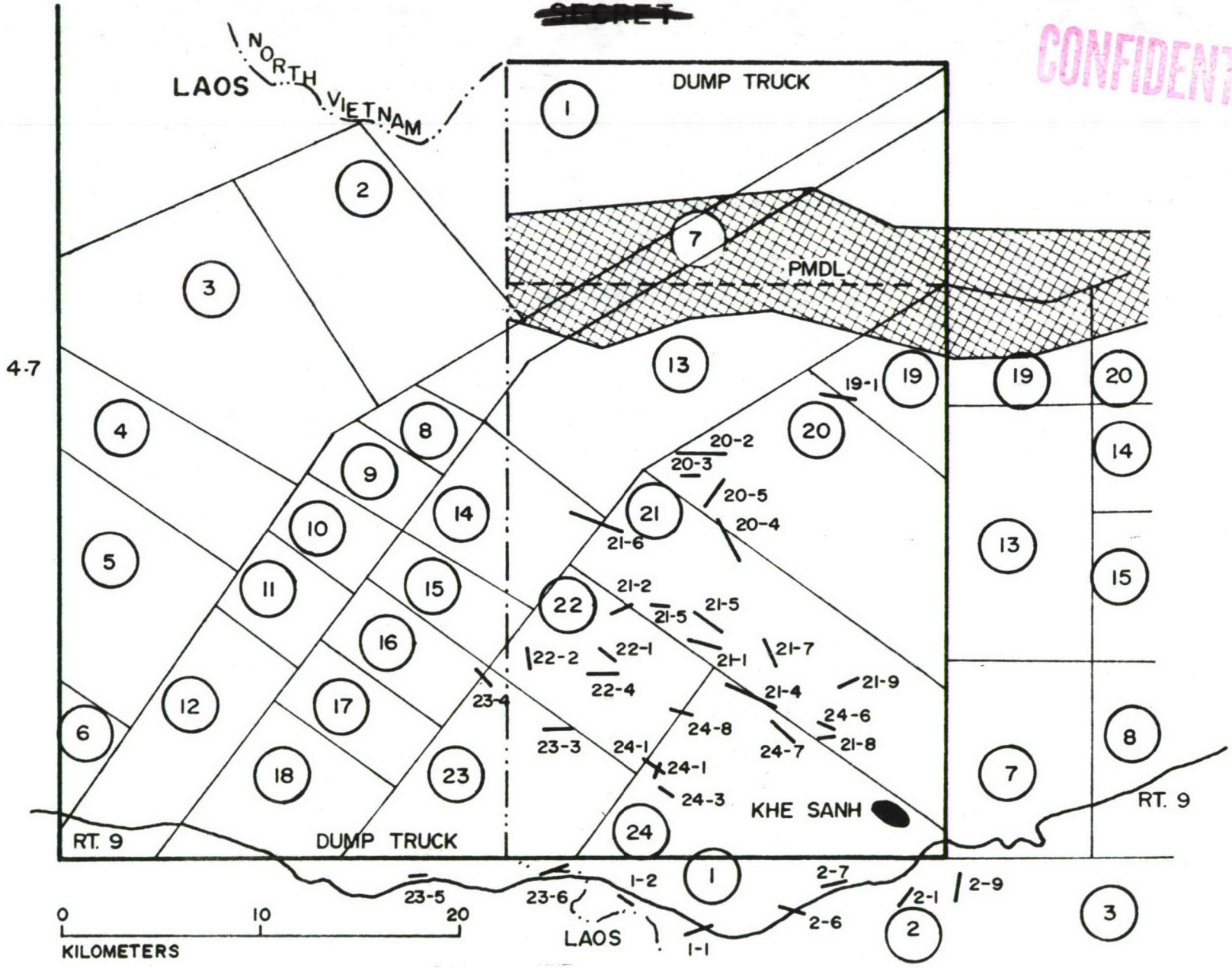

ACTIVE DUMP TRUCK SENSOR LOCATIONS — 28 MARCH 1968

FIGURE 9

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[redacted]

"...We shifted from firing at point targets to /firing at/ area targets, and we used the sensors to tell us when a major troop movement was occurring or a supply mission was taking place. The sensors now did not tell us where to shoot, but when lucrative targets would most likely be in known locations.

"An example of how the sensors gave us our only warning was in the attack on hill 881 south. To the southwest of hill 881 south, there is a ridge line running from southeast to northwest with a trail along the top. The nearest approach of the trail to the hill top is slightly over 1 km. Sensor strings had been placed all along the trail, and to the northeast of the trail along the ridge from his base areas in Laos into Khe Sanh. A sensor string up the trail about 3 km from hill 881 was usually our first indication of traffic. One night no activity was detected anywhere along the trail even though for the previous two nights there had been heavy activity from all the sensors in the area. On this particular night around midnight, all the sensors on the northwest side of the trail began to activate, not just once, but many times until by adding all the troop estimates given to us by the ISC, there seemed to be at least 2,000 to 3,000 enemy in a small area. It appeared that a regiment had moved in during the last two days and was now assembling in a position to attack hill 881.

"This was the only intelligence we had of the impending attack, and it took about 45 minutes for the targeting and intelligence shop to convince the S-3 that an attack was imminent. We then took all our artillery resources and for about 30 minutes directed them all into an area of about 500 by 1,000 meters between the road and hill 881. When we stopped the fires, we asked the ISC for a readout. We were told that they had heard our fires, and that now there seemed to be incredible confusion in the area. There are screams, yells, panics and orders. To us it sounds like a regiment, or what is left of it, in perfect confusion trying to pull out in a hurry."

This officer also described the defensive tactics used against enemy assaults on the camp. Varied intelligence would usually indicate when an attack was imminent and the sensors would tell precisely where the enemy was located and identify the exact time the attack was starting. When the assault began, the 175-mm guns at Camp Carroll put down fire on the east flank of the

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enemy, while the 105-mm and 155-mm guns at Khe Sanh laid barrages on the west flank and rear. Machine guns, small arms, and 60-mm and 81-mm mortars stopped the assault force at the perimeter, while airstrikes hit the probable reserves. In five such attacks, the body count totaled 1,600 enemy dead on the wire. The Bru Montagnards in the area reported many enemy dead from air and artillery strikes, and intelligence reported several assault forces refused to attack when commanded for fear of certain death. In describing these events, the target officer continually emphasized that it was the sensors that provided the time and place of attack.[88/]

A memorandum written in September 1968 by the Analysis and Reports Branch, Task Force Alpha, came to many conclusions similar to those of the Marine target officer:[89/]

> *"DUMP TRUCK/Khe Sanh sensor fields have given ISC the capability to detect both moving and stationary activity in the antipersonnel area. However, this capability is limited by the mobility of personnel and the alternatives of routes offered by a complex trail network. In order to provide maximum coverage of such a network, sensor strings are often emplaced across the trails rather than parallel to them. While this extends detection capability over a number of alternative routes, it diminishes the capability to determine direction and speed of movement. Furthermore, when direction and speed can be determined, the multiple choice of routes makes it impractical to track the target ahead. On the other hand, experiences in Battlefield Surveillance have demonstrated the ISC's capability to provide indicators of enemy movement patterns and battlefield tactics."*

Toward the end of the siege, Microtale direct readout equipment was installed at Khe Sanh. By putting these with forward observers who could monitor several sensor strings within line of sight, the Marines had an organic and

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workable system for using sensors to generate targets. The readout was real-time and the observer could exclude probable false alarms from artillery and aircraft. Being familiar with the terrain, the forward observer could guess the probable target location in relation to the sensors and call for artillery at Khe Sanh without the usual time-consuming coordination steps that data processing via Nakhon Phanom (NKP) required. According to the Khe Sanh target officer, "Activations from the sensors read by the microtales were almost always taken under fire, even though the other sensor reports, from NKP, rarely were toward the end." The microtale was too limited in capability to identify mass activity.[90/]

Sensor data relayed by the EC-121 went into Air Force intelligence channels as well as to the Marines. The CHECO report on the siege of Khe Sanh detailed the unprecedented in-country intelligence effort run by 7AF at Tan Son Nhut to provide targets for NIAGARA--the SLAM in defense of the combat base. Sensor data joined photo and human intelligence in providing an all-source target data base. Not only did 7AF target its own aircraft based on this data, but the Marines used it in the form of Hot Item Reports and computer runs to target their artillery and close air support.[91/]

Marine Mobility and DUEL BLADE II

With the end of NIAGARA on 31 March, the Air Force participation in northern Quang Tri operations lessened. NIAGARA had had several in-country zones where 7AF could frag airstrikes without coordinating with the ground commanders. These zones lapsed with the end of the operation. At the same time, the massive B-52 strikes shifted to Laos and II and III Corps. Even the debate over the Forward Bomb Line slipped into the background for a while,

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because the siege of Khe Sanh had caused COMUSMACV to place the 1st Marine Air Wing (less helicopters) under operational direction of the 7AF Commander, thus reducing the command and control questions regarding the FBL to part of a larger debate. Then the November bombing halt closed TALLY HO to offensive air operations.

By mid-summer 1968, many NVA units had withdrawn from northern Quang Tri, allowing the 3d MarDiv and Marine aircraft to cope more easily with the remaining threat. Though the Marines went ahead with their sensor program, the 7AF DUMP TRUCK operation was not implemented. Seventh Air Force chose to delay the antipersonnel system and redouble efforts in the antivehicle system. North of the DMZ, a major choke point interdiction campaign received heavy emphasis from July through October, but its center of operations lay north of TALLY HO. Even the previously described interdiction campaign against Route 1036 was against a road angling west around the DMZ, rather than south toward the forward Marine positions. Then in November the bombing halt in North Vietnam and the DMZ brought the "understanding" that the NVA would not mount attacks from the zone. Partial observance of this tacit understanding by the enemy led to a further waning of military operations around the DMZ.

From the perspective of mid-1969, the sieges of Con Thien and Khe Sanh marked the peak of Air Force participation in operations around the DMZ. A year later, the area received few Air Force sorties. A tabulation of tactical airstrikes in the 3d MarDiv area, including the DMZ, for 1 March through 15 April 1969 showed that the Air Force furnished one sortie in ten.[92/] In recognition of the predominant Marine effort, this report will sketch the military trends

of the 15 months prior to July 1969, and describe the Marine sensor program in particular. It will then examine two subjects of special interest to the Air Force: the enemy helicopters in the DMZ and the renewed Forward Bomb Line debate revitalized by Operation THOR.

Just prior to the Tet Offensive and the siege of Khe Sanh, the 1st Cavalry Division entered Thua Thien, the province below Quang Tri. Then in February, the 101st Airborne Division arrived to help liberate Hue. Not only did these deployments permit the 3d MarDiv to concentrate forces in northern Quang Tri, they made the U.S. Army the numerically superior force in the two northern provinces. By April 1968, there were 31 Army maneuver battalions versus 24 Marine battalions.[93/] In March, COMUSMACV created the Provisional Corps Vietnam (PCV), later renamed XXIV Corps, and put an Army general in command. Also at this time, heavy Army artillery moved near the DMZ to enhance counterbattery fire for the Marines, who were light on artillery compared to the NVA.[94/]

This U.S. concentration of forces countered the enemy buildup. Intelligence officers at PCV in late March 1968 identified one NVA division in the DMZ and three around Khe Sanh.[95/] Later, the enemy threat at Khe Sanh abated, but it continued high around Dong Ha and Quang Tri City. For instance, in late April 1968, an estimated 17 enemy battalions operated within the so-called Leatherneck Square.[96/]

The enemy used the DMZ as a sanctuary for refitting and staging regimental attacks from the central and eastern DMZ on forward Marine and ARVN positions. It was through the ARVN area of operation around Gio Linh that elements of the

320th NVA Division moved south in late April 1968, only to suffer extreme losses in the battle of Dai Do within three kilometers of Dong Ha. This division reportedly lost nearly 3,000 KIA from late April to the end of May in the eastern lowlands.[97]

Mobile Marine operations expanded under two new commanders: Maj. Gen. Raymond Davis (3d MarDiv) and Lt. Gen. R. G. Stilwell (XXIV Corps).[98] One harbinger of mobility was DRUMFIRE II, a brief operation at the end of May, to attack enemy long-range artillery by putting eight heavy guns into Khe Sanh to fire 1,800 rounds and then pulling them out 48 hours later. According to the After Action Report:[99]

> *"Drum Fire II verified the feasibility and desirability of the employment of heavy artillery units in forward firing positions for limited periods of time. It appears that enemy reaction time is not rapid enough to bring counter fire to bear on hastily occupied positions."*

In simple terms, the 3d MarDiv became airmobile to the extent possible for a division without organic or assigned helicopters. The 1st Marine Air Wing supplied the helicopters. Mobile operations replaced static defenses; the airlift of troops increased. In the first five months of 1968, the division had a monthly average of 8,900 troops helilifted, compared to the monthly average of 39,000 moved in the next four months.[100]

The division kept three infantry regiments shifting into new areas of operation, often with one unit entering on the heels of a withdrawing unit. This juggling spread the fighting among the regiments and avoided settling units into camps that would require increased base defenses. Artillery fire support

bases opened and closed in rapid succession to decrease the time the enemy had to conduct attacks by fire. These mobile operations--costly in transportation and logistics--put the enemy on the defensive and permitted deep U.S. penetrations into areas formerly little visited, such as the A Shau Valley and north of Khe Sanh. These tactics also disrupted enemy rear logistics areas and kept his regiments at bay in the DMZ.

In the summer and fall of 1968, the Marines pushed the enemy away from the towns and the rice crop. Yet, enemy pressure continued through July, though with some evidence of the battlefield lull then in the rest of I Corps. From 1-7 July, the SLAM THOR attacked enemy artillery inside and north of the zone, while pressure on Khe Sanh continued until the camp closed in July (to reduce static U.S. defenses). No Third Offensive occurred in northern Quang Tri during August. In September and October 1968, Operations LANCASTER II and KENTUCKY drove the NVA from the lowlands into the DMZ. Captured documents told of severe enemy food shortages and troop losses. After the bombing halt, a lull came to northern Quang Tri, with the enemy especially quiet during December and January.

On 1 November 1968, at 2100 hours Saigon time, the U.S. stopped offensive operations within North Vietnam and throughout the DMZ.[101/] Though at first no U.S. troops entered the zone, by late November the rules permitted squad patrols into the southern half and authorized larger extraction forces. These recondo squads were to conduct reconnaissance, not attacks. The fire control Rules of Engagement permitted air reconnaissance over the DMZ and attacks on any enemy firing on U.S. aircraft. Enemy ground fire and artillery fire would be returned

and, in the southern half of the zone, any confirmed enemy position could be attacked by air and artillery.[102]

In the first half of 1969, the NVA twice sent a regiment through the central DMZ, and both times the regiment withdrew with heavy casualties. In March, MONTANA MAULER did just that to the 27th Regiment. In April and early May 1969, the 36th NVA Regiment likewise suffered severe losses and retreated north of the Ben Hai River. Although the infiltration of an occasional NVA regiment violated the tacit agreement concerning the bombing halt, the NVA sent nothing the U.S. and ARVN forces could not easily handle. This contrasted sharply with the several divisions pressuring Route 9 from Dong Ha to Khe Sanh the year before.[103]

The same dramatic reversal of enemy fortunes occurred in western Quang Tri. From three divisions in the siege of Khe Sanh, NVA forces declined to two regiments a year later. In fact, the XXIV Corps order of battle for May 1969 for the entire B-5 Front showed all units in or north of the DMZ, aside from two regiments in the DMZ/Rockpile/Khe Sanh area and a Viet Cong regiment, (recently upgraded from a group), in the Gio Linh area.[104] By April and May 1969, the Marines had their mobile operations in full swing along the western DMZ (SCOTLAND II), the Laotian border (MAINE CRAG), and south to the A Shau Valley (DEWEY CANYON). Task Force Hotel at Vandergrift, under the 3d MarDiv, controlled these multi-regimental forces in western Quang Tri. In the east, mere companies held the Alpha bases still open, while Army tanks of the 1st Brigade/5th Infantry Division (Mechanized) patrolled the lowlands for the 3d MarDiv.

Tactical air support for these operations came mostly from Marine resources.

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During six weeks in March and April 1969, the Marine FACs and radar directed 88 percent of nearly a thousand sorties north of Route 9, and Marine fighters flew 74 percent of the sorties, with the Navy adding another 16 percent.[105/]

By the end of this reporting period, it was undetermined exactly how much the mobile operations had contributed to the temporary clearing of northern Quang Tri, and how much was due to changes of tactics by Hanoi. In any case, by July 1969, the military situation had improved so much, that the 9th Marine Regiment of the 3d MarDiv left northern Quang Tri and Vietnam, as a gesture to the North Vietnamese of American willingness to end the war.

The shift from static to mobile operations led the Marines to expand and diversify their sensor program. Actively seeking the enemy required accurate and timely intelligence, which the 3d MarDiv received from its ground and airborne surveillance program. Sophisticated electronic sensors planted along known and suspected enemy infiltration routes monitored enemy movements far from American eyes. The evolving Marine capability doubly affected the Air Force. First, Air Force experts trained and supported parts of the Marine operations. Second, implications for roles and missions clearly existed for both air and ground commanders.

The Marines had picked up the pieces of the obstacle barrier after Khe Sanh, and resumed hardening the strong points and training sensor teams. In May 1968, the 3d MarDiv formed a Ground Surveillance Section at headquarters with three officers and eight enlisted men. This organization was a pioneering effort for both the division and the Marine Corps. Planning proceeded on a Defile System (DFS), and a letter of instruction was published to "increase

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command awareness of the requirement for integrated battlefield surveillance planning".[106] In the next few months, the engineers built hundreds of bunkers at the nine original Alpha and Charlie sites and at additional "strong points" such as Ca Lu and Camp Carroll. By August, the engineers had completed 390 of 900 bunkers planned at 12 separate camps.[107]

This increase in the number of sites slated for sensor defenses marked a shift away from the strict barrier. As early as April 1968, III MAF had outlined a plan of "maximum economy of force", but foresaw the manning of strong points with forces "appropriate to the threat".[108] This allowed more flexibility than the old rule of thumb of a battalion at each Alpha site. Five months later the planners still wavered between the old linear obstacle trace and the dispersion of DUEL BLADE sites, but the increasing mobility tipped the scales away from the static barrier.

In the last four months of 1968, the building of DUEL BLADE ground to a halt and the 3d MarDiv and XXIV Corps submitted new plans to modify the strong point barrier. DUEL BLADE remained dormant during this period. However, at III MAF and MACV planning went forward, including orders to resume issuing DUEL BLADE material and the decision to close A-3, C-3, and Camp Carroll.[109] Engineers then went to work, turning Vandergrift Combat Base into the hub around which free wheeling western Quang Tri operations would revolve. The new plan--DUEL BLADE II--swept away the obstacle barrier, and replaced it with offensive operations screened by an all-source surveillance system.

The published DUEL BLADE II concept of operations for the 3d MarDiv required surveillance screening and an intelligence exploitation center:[110]

- In coordination with elements of 1st ARVN Div, establish an anti-infiltration system along the southern trace of the DMZ and in the vicinity of the Laotian border.
- Establish and operate a combined Tactical Surveillance Center (TSC).
- Conduct training for 3d MarDiv and 1st ARVN Div personnel for TSC operations, sensor emplacement and readout, supply, maintenance, and control.
- Manage and effect custodial control of those DUEL BLADE II assets made available to 3d MarDiv and 1st ARVN Div anti-infiltration system.

While foreseeing the eventual establishment of an automated computerized center, initially DUEL BLADE II would use the existing division surveillance facilities and later would install DART or SRP as an interim measure. This Deployable Automatic Relay Terminal was a surveillance center built into movable capsules. However, the first DART went to III Corps and, as of this writing, the Marines had none, though one was being scheduled for deployment to II Corps.

A wide range of surveillance activities fed data into Dong Ha: ground patrols, photo reconnaissance, airborne infrared sensors (AIR), side-looking airborne radar (SLAR), visual reconnaissance (VR), airborne personnel detectors (APD), ground surveillance radars (GSR), electronic sensors, and other surveillance equipment such as night observation devices (NOD) and xenon searchlights. This report is concerned with the electronic sensors. These included the hand emplaced seismic intrusion devices (HANDSIDs), the magnetic intrusion devices (MAGIDs), the air delivered seismic intrusion devices (ADSIDs), and the acoustic sensors (Acoubuoy). The Marines much preferred the HANDSID, because its hand emplacement assured accurate location. Also, a manual installation could

include a MAGID in the sensor string to weed out false alarms. The MAGID activated from metal such as a rifle within seven to ten meters, and it did not give false alarms as did the seismic sensors often activated by low flying aircraft or a high wind moving tree roots. However, where hand emplacement was impractical or too dangerous, the Marines relied on air drops from helicopters or Air Force F-4s.

In the first half of 1969, 7AF emplaced 132 acoustic and 147 seismic sensors in DUEL BLADE II. At midyear, 30 seismic and 47 acoustic sensors were operational in 25 strings.[111/] In addition, the Marines hand emplaced strings and dropped others from helicopters. By having only six channels with 27 tone codes each, the division could theoretically run about 160 sensors. But by monitoring some sensors on line-of-sight and using mountains as screens, the 3d MarDiv could on a carefully planned basis deliberately exploit duplicate tone codes in several areas.[112/]

An Air Force EC-121 called Bat Cat out of Korat monitored all strings beyond Marine range, manually read the returns, and relayed the identified target locations to Dong Ha. The division could then confirm the absence of friendly forces and direct artillery on the pre-cleared grids. Very few damage assessments were obtained from these indirect firings. Task Force Hotel at Vandergrift also received the EC-121 reports, which it used for intelligence. According to the Air Force liaison at Vandergrift, the time from the EC-121's identification of target to actual artillery fire ran around 15 minutes.[113/] The EC-121 also relayed the sensor data automatically to Task Force Alpha at Nakhon Phanom for analysis and reports.

A brief description of the Con Thien surveillance activities will illustrate part of the Marine program. Con Thien lay on a cluster of hills rising 158 meters. As the highest point in Leatherneck Square, Con Thien overlooked the lowlands from the foot of Dong Ha Mountain to the coastal sand dunes. The Ben Hai River passed three miles to the north and the coastal dunes lay less than ten miles to the east. At night, little clusters of lights marked Gio Linh and A-1, while Cam Lo and Dong Ha made a line of lights to the south. Occasional parachute flares hung light in the black sky and piercing xenon searchlights restlessly swept the dark ground. A total blackout prevailed north of the Ben Hai.

This natural observation post guarded the DMZ with sensors, radar, and NODs. Each night two crews established perimeter positions near Army tanks and set up personnel radar scanners, NODs, and jeep-mounted xenon searchlights. This perimeter surveillance, extending from 1,500 to 2,000 meters, often spotted the enemy from sufficient distance to catch him unprepared.

In May 1969, Con Thien's electronic surveillance team of 10 to 12 men also monitored six sensor strings, with two located near the camp and four in the DMZ. Emplacement teams backed by tanks put four sensors to a string 50-100 meters apart and within 30 meters of the trail. The HANDSID operated about 45 days, but the Marines talked of battery packs to extend the life to six months.[114/]

The readout was made from a Microtale receiver placed in one of the camp's many half-buried bunkers. Three or more activations per minute indicated probable personnel, and then clearance was obtained to fire on them. Since artillery

could fire the first round within two minutes of the initial request, the Marines had "kill zones" plotted so fire could be directed on the probable enemy location two minutes after the activations. Available artillery at Con Thien included 175-mm guns, 8" howitzers, and 40-mm tank fire, with additional heavy artillery fire available from C-2. Firing on a probable enemy at a particular location was a significant improvement over the blind, random harassment and interdiction (H&I) fire common in Vietnam.[115] (Appendix II reproduces some extracts from weekly summaries of sensor operations.)

The ARVN maintained a similar surveillance program at their A-1 and A-2 sites, including the monitoring of sensors they had emplaced. Their C-1 camp provided heavy artillery fire. The initial ARVN skepticism with seismic sensors was overcome by placing acoustic sensors in the target areas to record the incoming rounds and enemy screams. Although the Marines received only sporadic intelligence from the ARVN, the main purpose was accomplished--giving the South Vietnamese the experience to someday take over the whole DMZ surveillance program.[116]

Much of northwest Quang Tri lay beyond the Marine's line of sight reception capability, and sensor activations had to be relayed through the Air Force EC-121. In this way, isolated areas came under 24-hour watch. The Marines ran a few small tests to place a Microtale receiver in a Marine C-117 and S-2B, with mixed results and communication problems.[117] However, III MAF realized the importance of an organic airborne readout capability and so informed higher headquarters:[118]

"III MAF strongly recommends that the Marine Corps attain an organic sensor/munitions air delivery and airborne monitoring capability at an early date. Current III MAF sensor experience in RVN has been limited to hand emplaced sensors monitored at ground readout stations employing line of sight Microtale equipment. The nature of the terrain and dense foliage in I CTZ has severely reduced readout ranges attainable. It is recognized that present hand emplaced sensors and ground readout equipment are considered prototype and further experimentation will produce more sophistication. This premise, however, does not obviate the requirement for the Marine Corps to attain a sensor/munitions air delivery and airborne monitoring capability at the earliest."

Further, III MAF foresaw using sensors in amphibious landings.

The Marines recognized clearly the great potential of sensors and other surveillance aids despite the Corps' limited experience with such equipment. The 3d MarDiv broke new ground by establishing a ground surveillance section, and creating emplacement and surveillance teams. Equally important, the Marines perceived implications of the various surveillance devices for locating enemy troop concentrations and storage areas, and thus identifying lucrative targets for ground operations and intensified air/artillery strikes. By the same token, surrounding permanent Allied camps with warning devices reduced the chances of surprise attacks and located the enemy before he reached the perimeter wire. This latter fact allowed heavier and more deadly use of artillery in defense of the camp.

Enemy Helicopters

While the Marines had responsibility for stopping enemy ground infiltration, the Air Force handled air defenses over the zone. From June through September 1968, heavy suspected enemy helicopter activity in the DMZ caused

7AF to take several countermeasures. The Commander, 7AF, had responsibility for air defenses of mainland Southeast Asia, which he exercised through a command chain running from the Tactical Air Control Center (TACC) at Tan Son Nhut, down to the Panama Control and Reporting Center (CRC) at Da Nang, to the Waterboy Control and Reporting Post (CRP) at Dong Ha. Control of airspace north of the DMZ lay immediately with Waterboy. However, in and south of the DMZ, the Marine flight control at Dong Ha--Vice Squad--was the principal air control agency. Before U.S. aircraft could fire on another aircraft in the general DMZ area, Waterboy and Vice Squad had to identify and clear the target as not friendly.

The occasional UFO reports were handled by Waterboy in a routine fashion that satisfactorily insured identification of probable non-friendly aircraft. Then on the evening of 15 June, a sudden rash of visual and radar reports indicated many enemy helicopters in the DMZ. The first report came at 2139 hours when Dong Ha DASC relayed to Waterboy a 12th Marine Regiment report of four unidentified helicopters flying from the mouth of the Ben Hai River to Tiger Island, 15 miles off the coast. The 7AF TACC ordered "sterilization" of the area and confirmation from all friendly units of any of their helicopters in the area. By midnight, all friendly aircraft were located and Air Force aircraft and Navy vessels were receiving clearances to fire on enemy helicopters.[119/]

What happened on the two nights from 15 through 17 June 1968 remains uncertain, although a joint service conference at 7AF headquarters a few days later reconstructed the probable events. Apparently, the following happened:

on the evening of 15 June 1968, 10 to 12 enemy MI-4 helicopters flew south into the DMZ on a probable ammunition resupply mission and established a shuttle between Tiger Island and the DMZ. Soon after they appeared in the zone, U.S. ships and planes were attacking.[120/]

Just after midnight, the cruiser, USS Boston, which had been firing on helicopters confirmed by a spotter plane, got a fast moving radar contact coming from the DMZ. Gunfighter 5--an Air Force F-4 from Da Nang--fired two AIM-7s at the same time that three rockets reportedly exploded within 200 to 400 yards of the cruiser. Fifty minutes later, the Navy Swiftboat PCF-19, near the mouth of the Ben Hai, was sunk with no crew losses. Although Gunfighters 3/4 fired four missiles in the area just prior to the incident, the sailors said a helicopter similar to the MI-4 launched the attack with automatic weapons and rocket fire. This swirl of attacks and counterattacks continued through the night. More Gunfighters launched missiles; the USS Boston attacked Tiger Island, and a Swiftboat received hostile shore fire from north of the DMZ.[121/]

Although the TACC had followed the minute-by-minute reports from the DMZ, it was not notified that Air Force missiles may have landed near Navy vessels. The following comments from two separate resumes show this:[122/]

> *"During the night of 15-16 June this headquarters /7AF/ was not informed of any incident involving U.S. aircraft and friendly ships. All engagements between aircraft and targets were velieved to be with enemy helicopters. Reported engagements of ships were with unknown helicopters or shore fire.*
>
> *"The naval ships were not in the position which Waterboy had previously received, consequently when the Boston reported to be under attack, Waterboy*

having exact position of the F-4 aircraft didn't relate it to their fighters. Additional confusion existed when the Commander of the Boston confirmed a MIG attacking his ship."

The next night the MI-4s continued their shuttle into the DMZ. Visual and radar sightings flooded the control centers, which scrambled aircraft. Simultaneously, enemy and friendly guns engaged in a heavy artillery duel and Air Force fighters continued flying into TALLY HO on interdiction missions. At 2150 hours, Gunfighter 5 fired two missiles and ground reported one helicopter hit with falling, burning parts. At midnight, Gunfighter 4, by the light of flares, spotted three helicopters on the ground near a village north of the Ben Hai and dropped six 500-pound bombs. One large secondary and two medium fires were reported. Then his partner, Gunfighter 3, fired a missile and a nearby KC-135 reported seeing an explosion and falling debris.[123/]

In the early hours of 17 June, three friendly ships were fired on by Air Force F-4s under the control and clearance of Waterboy. Gunfighter 1 fired two missiles that landed near the USS Boston, causing light damage but no casualties. A serial number on the shrapnel linked the missile to the fighter. At 0310 hours, Gunfighter 6 fired two AIM-7s which hit the HMAS Hobart, killing two Australians and wounding seven. The shrapnel was American. A few minutes later this same aircraft fired one AIM-9 at a reported helicopter and the missile impacted near the USS Edson. Just at that time, TACC ordered Gunfighters not to fire, unless they had positive visual identifications.[124/]

By morning, the dangerous situation was all too clear, though the exact facts remained scrambled in a confusion of mistaken location and battle reports.

The Commander, Seventh Fleet, stopped night fleet operations within 30 miles of Cape Mui Lay.[125/] Seventh Air Force declared the area "sanitized" for the next few nights. Since the stated objective of this latter action was to monitor enemy aircraft, "The object is not repeat not to destroy the helicopters unless they pose an immediate threat to friendly forces."[126/] Control and coordination procedures were reviewed, reemphasized, and expanded (especially with the USS Boston) to eliminate the confusion of the previous nights.

The helicopter sightings continued high until 22 June and then became more sporadic. From then through August, several projects and tests were conducted by the Air Force along complementary lines to acquire and identify the helicopter threat. Three broad questions existed: (1) what equipment could fill the low altitude radar gap along the DMZ; (2) how much chance had a camera or fighter pilot of photographically or visually acquiring a low flying helicopter at night; and (3) could the presence of enemy helicopters be confirmed?

To provide better low altitude radar coverage over the DMZ, 7AF considered several alternatives. Mobile search radar was not intended to be low, close-ranged radar and it suffered from high ground clutter return. The EC-121 COLLEGE EYE had an Airborne Moving Target Indicator, but this also suffered clutter effects over land. The best solution proved to be resetting one of the two Waterboy antennas for low altitude resolution.[127/]

The several direct hits or near misses on friendly vessels by Air Force missiles obviously raised the question of what went wrong with target acquisition. The pilots, based on their radar and visual sightings, fired at what they thought were helicopters. The joint service conference on the UFO problem

took note of one possibility:[128]

> *"It is important to note that only in the case of the Hobart were the recorded targets in close proximity to ships. It is possible that targets fired on were airborne and that missiles subsequently /were/ guided on the stronger radar return from ships in the vicinity."*

In July 1968, 7AF ran tests to determine the capability of the F-4 and A-37 to accomplish low-level intercept of helicopters, with the A-37 pilots especially testing the light-gathering Starlight Scope.[129] The test conclusions were:[130]

F-4

- The F-4D fire control system has the capability to acquire and track helicopters at all lower altitudes over water when the sea state is relatively calm.
- Surface craft up to the size of a freighter and helicopters present nearly identical images on the F-4 radar scope.
- The fire control system cannot be used to reliably differentiate between ships and airborne helicopters, if the helicopter approximates that ship's speed at very low altitude.
- This weapon system can be effectively employed against low flying helicopters provided the terrain is flat and the area is sanitized of all friendly forces.

A-37

- Pilots of the A-37 [at night] could not locate the blacked out helicopter after being vectored to within one mile.
- Positive identification could not be accomplished from the cockpit of the A-37 with helicopter lights on and with or without the starlight scope.

The test with the A-37, however, did determine that Army radar for the ground-to-air Hawk could acquire and track helicopters at very low altitudes over

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water, and "qualified controllers" could run successful A-37 intercepts using the Hawk radar.[131]

Another facet of target identification involved confirming the many visual, radar, and infrared sightings. No "hard evidence" such as photographs or wreckage was obtained. On three successive August nights, RF-4s flew a total of 12 sorties against 34 radar-plotted UFO targets. The photos showed no helicopters despite several runs which, according to the radar, passed directly over the targets.[132] On 28 August, an RF-4C using photo flash cartridges ran controlled tests to photograph a friendly helicopter at night. Of 38 exposed frames made on four passes, only two frames showed the helicopter. The summary of results to the 7AF Command Section said:[133]

> *"This test confirms previous opinion by DOCR that chances of photographing one of the UFOs in the DMZ is extremely remote....Even the two successful exposures required last minute flight correction by a DOCR representative riding in the lead helicopter."*

Two special projects were established to observe the UFOs from Con Thien, the highest hill in the eastern DMZ area. The primary mission of project HAVE FEAR did not concern the helicopter reports, but this Air Force Weapons Laboratory project had laser range finders and night observation devices (NOD) that offered some chance of identifying the sightings. HAVE FEAR personnel saw red lights and got video blips. The UFOs usually traveled at speeds from 30 to 80 mph at altitudes from 1,200 to 1,600 feet. After several days of tracking, the red blinking lights would extinguish when under HAVE FEAR surveillance. The project ran from 4-12 August 1968 and resumed from 18-31 August.[134]

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In mid-August, HAVE FEAR was joined by Project LETHAL CHASER, which used manpack radar. From 18 August through 3 September 1968, the several observation systems conducted a joint, integrated search that also employed Waterboy radar. The criteria for a valid track included the UFO being within 11 miles of Con Thien, being unidentified by Jazzy Control, having a track of at least two minutes duration, and traveling at less than 180 mph. This joint effort got 67 valid tracks, but no conclusive identifications.[135/]

By late August, the helicopter situation dwindled away into occasional sightings and little new technical data. Several times the peculiarities of the tracks and the lack of confirmation where expected (such as from troops in the plotted area) defied adequate explanation. The 7AF Commander decided the results could not justify continuing the projects and MACV concurred.

THOR and the Forward Bomb Line

In mid-June 1968, III MAF proposed "a carefully phased and integrated application of massed air, artillery, and Naval Gunfire" against enemy artillery in the Cap Mui Lay Sector.[136/] (This sector included the eastern DMZ and the corner of TALLY HO shown in the lower map in Figure 7.) Three months earlier, III MAF had proposed to 7AF that a SLAM be conducted in the Cap Mui Lay area.[137/] None was. By June, the Marines had their own plan, with III MAF as the controlling agency. This proposed operation would have four phases, beginning with a massive bombardment to make the sector permissive to low performance aircraft and close-in naval gunfire. Objectionable, in 7AF's view, was III MAF's control of the last three phases, with the final phase running indefinitely. This meant moving the FBL into TALLY HO and suspending the MACV directive so

laboriously hammered out in late 1967. Further, III MAF proposed no cutoff date for returning the FBL to the northern boundary of the DMZ.[138/] Seventh Air Force presumably remembered the "temporary" extension in Operation HICKORY that became the permanent line. However, COMUSMACV approved the SLAM, named it THOR, and stipulated an operation ending on the seventh day.[139/]

Seventh Air Force controlled the B-52 and tactical air saturation attack of the first two days that silenced the enemy's artillery and crippled his defense and resupply capabilities. Behind this wall of firepower, U.S. heavy artillery moved close to the zone. For the next five days, a combined air/artillery/naval gunfire campaign directed by III MAF systematically destroyed all known enemy positions. The enemy was stunned. Not until D+5 did NVA artillery return fire against the U.S. artillery massed for THOR. Army O-1s flew throughout the Cap Mui Lay Sector without a single loss and the Navy moved close to the enemy shore batteries.[140/]

Disagreement arose between III MAF and 7AF over the results versus the cost. Some 7AF planners questioned the concentration of such massive air resources against one small area to achieve unknown or "inferred" results.[141/] In seven days, nearly 2,000 strike sorties and 300 support sorties converged on the Cap Mui Lay Sector. The breakout for strike sorties was: 7AF 651, SAC 210, USN 500, and USMC 630. Estimating the actual bomb/gun damage assessment was difficult, because no ground search could be conducted in North Vietnam. (There was also other damage against other targets.) The XXIV Corps After Action Report, however, represents the crux of THOR, listing these damage totals:[142/]

TARGET	DESTROYED	DAMAGED
AA Positions	789	39
AA Weapons	63	-
Artillery Positions	179	24
Artillery Weapons	20	6

According to 7AF, these statistics looked deceptively better than they were, because most of the enemy positions were unoccupied at the time of strike. The BDA for 7AF/SAC included 98 artillery and 332 antiaircraft positions destroyed, of which only two and eleven, respectively, were occupied. This BDA came from extensive photo reconnaissance, much of it flown at low altitudes.[143/]

In response, III MAF questioned the reliance on photography "apparently of marginal effectiveness in this case" and said hand-held camera photos and visual sightings confirmed 18 enemy guns destroyed by observed howitzer fire. Further, III MAF cited declining casualties inflicted by enemy guns (67 KIA in May and June, and 5 in July and August). Other evidence included declining totals for monthly in-coming rounds from the Cap Mui Lay Sector, and an unprecedented permissiveness in and near the sector for Army O-1s and Navy warships. The III MAF Commander in a personal message to COMUSMACV proposed more THORS:[144/]

> *"I feel that the overall effectiveness of THOR is well substantiated and documented..../Therefore/, request authorization to plan and conduct future THOR type opns under the ground commander's control and, if necessary, using only his available resources."*

Also in mid-October 1968, III MAF requested the FBL be moved north to the Fire Support Coordination Line. (Fig. 7.) Justifications included the precedent and

success of THOR, the newly gained U.S. artillery superiority, and the special ability of the ground commander to target an enemy attacking U.S. troops.[145/]

Several ramifications stood out concerning THOR, the FBL, and future THORs, some of which were summarized by the 7AF Directorate of Intelligence:[146/]

> *"Review of photography obtained during Operation THOR failed to confirm the BDA claimed by III MAF. An inordinate amount of sorties were employed to achieve minimal effects. Moreover, MACV set aside agreed Command and Control procedures during THOR and placed 7AF and SAC forces operating in NVN temporarily under the direction of ground forces (III MAF). On 22 September 1968, a planning meeting was held at MACV to consider a XXIV Corps proposal for a follow-on to THOR during October 1968. Contemplated operations contained the same objectionable command/control features. XXIV Corps briefers cited seemingly impressive figures on AAA and FA /field artillery/ positions destroyed during THOR, but conveniently glossed over the fact that these were largely unoccupied positions, with BDA derived from sources of questionable validity."*

Seventh Air Force opposed extending the FBL or having more THORs under the ground commander's control. Formally responding to the III MAF suggestions, 7AF presented both operational and doctrinal reasons for continuing the command and control procedures in TALLY HO as defined in MACV Directive 95-1. According to 7AF, the III MAF proposals would make fire support coordination centers at division and corps levels the arbiters of the means of attack and would give the FSCC a veto over aircraft entering the airspace in question. Rather than such complications being compensated by benefits, the result would be to restrict targeting. The air commander had forces in the area, unlike the ground commander, and had a wide interest in all targets, not just those immediately attacking northern Quang Tri. Specifically, he was much concerned with AAA, SAMs, and

enemy logistics. Further, he stated:[147]

> *"The ground commander is not in the best position to target and control the flow in the area under discussion. Without aerial observation in the target area, the FSCC is unaware of the existence of most fleeting or time-urgent targets beyond the present FBL, and does not normally have the capability to assess BDA and the necessity for further strikes. The FSCC is not equipped or manned to manage the FACs other than as artillery spotters."*

Aside from these operational considerations, 7AF cited the Joint Chiefs of Staff (JCS) definitions to show that these did not substantiate III MAF proposals nor specify who would control and coordinate fires between the FBL and FSCL. The FBL existed to protect U.S. ground forces from short rounds and other uncoordinated bombing. Since III MAF forces could not cross into the northern half of the DMZ, the existing FBL already solved the problem.[148] It might also be noted the definition for the FSCL specifically referred to the ground commander and "fire not under his control", hardly implying he had control of such fire.[149]

Although the whole debate was shelved after the November bombing halt, MACV disapproved the FBL proposal of III MAF, but approved III MAF's request to conduct "coordinated fire support operations" north of the FBL, to include air when provided by COMUSMACV. This decision was consistent with COMUSMACV's practice of adjusting control and coordination lines around the DMZ to meet tactical necessity. By temporarily altering the lines, COMUSMACV applied Air Force and Marine fire power to specific enemy threats even when one of the services had to temporarily surrender an area of operation to the other.

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For instance, NIAGARA lay south of the FBL, and THOR lay north of the line. Such flexibility precluded either a fixed or final solution to the FBL debate.

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FOOTNOTES*

1. (TS/NF) Rprt, Hq PACAF, "Summary of Air Operations", Oct 66, pg 3.33; (TS/NF) OPLAN 481-68, Hq 7AF, "DYE MARKET," 10 Aug 67, pg D.1.
2. (U) Paper, 1st Wea Gp, TSNAB, "Weather and Climate of DMZ," 31 Oct 68.
3. (TS/NF) OPORD 515-68, Hq 7AF, "Muscle Shoals," Oct 67, pg D.1.
4. (S/NF) Computer Printout, IDHS, DI, 7AF, 18 May 69.
5. (S/NF) WAIS, Hq 7AF, 4 May 68, pg 10.
6. (TS/NF) CHECO Rprt, "Operation TALLY HO," Hq PACAF, DOTEC, 21 Nov 66, pp 1-7.
7. (S/NF) WAIS, Hq 7AF, "COMMANDO SABRE Forward Air Controllers," 18 Nov 67, pp 26-27.
8. (S) Ltr, Lt Col Herbert W. McQuown, Comdr, 205h TASS to 504th TASG, subj: Tour Extension for TALLY HO Aircrew Personnel, 19 Aug 68.
9. (S/NF) WAIS, Hq 7AF, "Night and All-Weather Reconnaissance," 23 Sep 67, pg 34.
10. (S) Personal Msg, Gen W. W. Momyer, Hq 7AF to CINCPACAF and PACAF, (Single Manager), 29 Feb 68.
11. (S/NF) Rprt, "COMMANDO HUNT," DOA, 7AF, 20 May 69, pp xx and 74.
12. (S/NF) Computer Printout, IDHS, DI, 7AF, 18 May 69.
13. (S) Study, "History of Defenses in RP I, 1 Apr-1 Nov 68," DIO, 7AF, 5 Feb 69, pg 2.
14. (S/NF) WAIS, Hq 7AF, 16 Sep 67, pg 6; 28 Oct 67, pg 6; 27 Jan 68, pg 17; 13 Apr 68, pp 3-4; 25 May 68, pg 10; 27 Jul 68, pg 11, and 2 Nov 68, pg 26.
15. Ibid; 13 Apr 68, pg 3.
16. Ibid; 18 May 68, pp 9-10 and 25 May 68, pg 10.
17. Ibid; "Bat Lake Road," 22 Jun 68, pp 3-4.
18. Ibid; 20 Jul 68, pg 10 and 27 Jul 68, pg 11.

* Extracts from TOP SECRET documents are classified no higher than SECRET.

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19. (S/NF) Rprt, DOA, 7AF, "COMMANDO HUNT," 20 May 69, pp 119-121.

20. (S) Study, DIO, 7AF, "History of Defenses in RP I, 1 Apr-1 Nov 68," 5 Feb 69, pg 7. (Hereafter cited: History of Defenses in RP I.)

21. (TS/NF) Rprt, Hq PACAF, "Summary of Air Operations," Sep 67-Oct 68, Section 5.

22. (S/NF) Study, DIO, 7AF, "History of Defenses in RP I, 1 Apr-1 Nov 68," 5 Feb 69, pg 7.

23. Ibid, pg 1.

24. (S/NF) WAIS, Hq 7AF, 12 Mar 67, pp 12, 19.

25. (TS/NF) CHECO Rprt, Hq PACAF, DOTEC, "Air War in the DMZ, January-August 1967," 20 May 68, pg 12.

26. Ibid; p 17.

27. (TS/NF) Rprt, Hq PACAF, "Summary of Air Operations," May 67, pg 10.

28. Ibid; Sep 67, pg 2, 5.14.

29. Ibid; pg 5.15.

30. (S) History of Defenses in RP I, pp 1, 6.

31. (S/NF) End of Tour Rprt, Brig Gen Jammie M. Philpott, DI, 7AF, 27 Nov 67, pg 8.

32. (S) History of Defenses in RP I, pg 5.

33. (S/NF) WAIS, Hq 7AF, 2 Sep 67, pp 36-42.

34. Ibid, 15 Jun 68, pg 8.

35. (S) History of Defenses in RP I, pg 6.

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40. (TS/AFEO) CHECO Rprt, "Operation HICKORY," 24 Jul 67, pp 1, 3.

41. (S) Msg, COMUSMACV to III MAF and 7AF, "Air/Artillery Coordination," 16 May 67.

42. (U) JCS Pub 1, 1 Jan 66, pp 78 and 81.

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44. (S) Msg, III MAF to COMUSMACV, (Forward Bomb Line), 6 Jul 67.

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46. (S) Msg, 7AF to COMUSMACV, "Location of Forward Bomb Line," 10 Jul 67.

47. (S) Msg, III MAF to COMUSMACV, "Forward Bomb Line (FBL)," 13 Jul 67.

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(S) Cmd Chronology, 3d MarDiv, Sep 67, pp 24-26.

49. (S/NF) End of Tour Rprt, Brig Gen Jammie M. Philpott, DI, 7AF, 27 Nov 67, pg 11.

50. (S/AFEO) Operation NEUTRALIZE.
(S) Cmd Chronology, 3d MarDiv, Sep 67, pp 24-26.

51. (S/AFEO) Operation NEUTRALIZE, pg 58.

52. (S) Trip Rprt, Lt Col H. J. Wonder, Comdr, Hillsboro ABCCC, undated, (Early Nov 67), pg 1.

53. (S/AFEO) Operation NEUTRALIZE, pg 34.

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56. (S/NF) WAIS, Hq 7AF, "Air and Artillery Strikes Other than CAS," 18 Nov 67, pg 28.

57. (S/NF) End of Tour Rprt, Brig Gen Jammie M. Philpott, DI, 7AF, 27 Nov 67, pg 9.

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59. (S) Trip Rprt, Lt Col H. J. Wonder, Comdr, Hillsboro ABCCC, "Special Report III MAF Coordinating Conference," undated, (Early Nov 67), pg 2.

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61. (S) Memo, Maj Gen Gordon F. Blood, DO, 7AF to Comdr, Hq 7AF, Gen W. W. Momyer, "MACV Meeting on Coordination of Forces, 14 Nov 67," undated (about 10 Nov 67).

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74. (TS/NF) Memo, Lt Gen Alfred D. Starbird, Dir, DCPG to Comdr, 7AF, "Trip Report and Reconnaissance," 12 Jan 68.

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145. (C) Msg, III MAF to COMUSMACV, "Relocation of Fwd Bomb Line (FBL)," 20 Oct 68.

146. (S) Ltr, Brig Gen George J. Keegan, Jr., DCS/Intell, 7AF to DOC and DOZ, "Project CHECO Study, 'Operation THOR 1-7 July 68,'" 25 Nov 68.

147. (S) Msg, 7AF to COMUSMACV, "Relocation of Forward Bomb Line (FBL) (S)," 31 Oct 68.

148. (U) JCS Pub 1, 1 Jan 66, pp 78 and 81.

149. (S) Msg, 7AF to COMUSMACV, "Relocation of Forward Bomb Line (FBL) (S)," 31 Oct 68.

APPENDIX I

Controlling Agents (FAC and Radar) and Strike Aircraft in Support of the 3rd Marine Division in the DMZ and Quang Tri North of Route 9, 1 March-15 April 1969

Controlling Agents

	Air Force		Marine		Navy	All Services		Total
	PP	Immed	PP	Immed	Immed	PP	Immed	PP + Immed
Air Force FACs	-	17	12	38	16	12	71	83
Army Forward Observers	-	8	3	17	2	3	27	30
Marine FACs	1	52	78	157	7	79	216	295
Marine Radar**	1	15	246	173	131	247	319	566
Total	2	92	339	385	156	341	633	974

** All TPQ-10, except for 19 preplans and 6 immediates (all Marine strike aircraft) controlled by Marine mobile equipment used by combat units to vector in airstrikes in support of themselves.

SOURCE: (C) Working Papers, Form 128, DASC Victor.

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APPENDIX II

Extracts Concerning DUEL BLADE Sensors

7-13 Feb 69: "Sensor detected EN targets engaged by arty with unknown results. Recon team inserted into areas of heavy sensor reading had light contact with EN forces on several occasions. A decrease from 70 to 30 sensor detected targets, vic XD96 [northwest of Rockpile], believed caused by enemy avoiding area of artillery fire which has been placed on trail where sensors are emplaced."

28 Feb-6 Mar 69: "Thirty strings totaling 108 sensors operational. In the ARVN AO, ten squad size sensor detected targets engaged by 840 rds of mixed 105/155mm arty. Results unknown. In the Fourth Marines AO 24 squad size targets detected. Arty responded with 134 rounds mixed 105/155 rds. Results unknown."

4-11 Apr 69: "Twenty-three strings totaling ninety-one sensors operative in the DUEL BLADE area. In ARVN AO, 17 sensor detected targets engaged by 309 rds mixed arty and mortars. BDA unknown. Air readout sensors acquired 41 targets, reacted to by 292 rds mixed arty. Elsewhere in DUEL BLADE area, 24 sensor detected targets engaged by 309 rds mixed arty and mortars. Negative BDA except one secondary explosion vic XD9465 [northwest of Rockpile]. Surveillance team at Oceanview (YD3072) [on coast just south of DMZ] detected five EN patrols, ranging from three to 12 personnel, reacted to by 93 rds 60mm mortar, 20 rds M-79 and 15 rds duster-fired [i.e., tank-fired] 40mm. Sweep team found blood trails and three EN abandoned anti-tank mines."

25 Apr-1 May 69: "Sweep revealed drag marks and blood trails after response in one instance."

9-15 May 69: "Emplacement team inserted, vic XD7541 [near Laotian border], to check validity of personnel and vehicular sensor activations along southern extension of Route 925 discovered two two-story houses and four trucks, called in AO [aerial observer] and fixed-wing aircraft, resulting in two houses destroyed, one truck destroyed and one large secondary explosion. Team encountered 15 NVA and initiated SAF [small arms fire]. Results, seven NVA KIA (BC). Airstrike in support of team resulted in one additional NVA KBA. No friendly casualties. On 10 May, in response to sensor activations, AO directed to vic YD0670 [in central southern half of DMZ], observed EN platoon and ran three airstrikes resulting in 13 EN KBA."

23-29 May 69: "Sensors in the DMZ detected ten tgts, while 83 tgts were detected below the DMZ. Surveillance teams detected 12 additional tgts, fire placed on ten. Recon patrol found eight bunkers, three new ones with beds and shelves. Trail in area was well marked with arrows pointing to fighting holes and bunkers. Recon team in vic XD6652 [near Laotian border] observed 12 NVA and a AAA gun nearby. Team took negative action and was extracted. Both areas had recorded heavy sensor recordings."

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25 Feb-3 Mar 69: "The interest and confidence in the sensor program on the part of the I CTZ commanders continue to increase and, as a result, the sensor program is continuously receiving more attention in tactical plans. During the period, operational sensors caused the enemy not to use certain terrain and desirable avenues of approach. As an example, a sign was found posted along a trail seeded with sensors in the vicinity of coord YD3839 [south of Quang Tri City outside the DUEL BLADE area] which stated "DANGER. MINES. If you go down this trail you will be blown up." Since there were no mines along the trail the sign was probably posted as a result of arty interdiction which responded to sensor target acquisition. Sensor fields also were considered valuable as an economy of force measure, a target acquisition means, and an indicator of patterns of enemy movement. Sensor employment allowed some friendly forces to be utilized in other critical areas."

SOURCE: (S) Msg, COMUSMACV to JCS et al, "DUFFEL BAG/OPREP-5," 16 Feb, 9 Mar, 13 Apr, 4 May, 18 May, and 1 Jun 69.
(S-NF) Msg, III MAF to COMUSMACV, "Weekly DUFFEL BAG/DUEL BLADE OPREP 5 Ser. No. 009/25 Feb through 3 Mar 69," 7 Mar 69.

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GLOSSARY

AAA	Antiaircraft Artillery
ABCCC	Airborne Battlefield Command and Control Center
ADSID	Air Delivered Seismic Intrusion Device
AIR	Airborne Infrared
APD	Airborne Personnel Detectors
ARVN	Army of Republic of Vietnam
AW/AA	Automatic Weapons/Antiaircraft (Weapons)
CICV	Combined Intelligence Center, Vietnam
CINCPAC	Commander-in-Chief, Pacific Command
COMUSMACV	Commander, U.S. Military Assistance Command, Vietnam
COSVN	Central Office South Vietnam (VC Control)
CRC	Control and Reporting Center
CRP	Control and Reporting Post
DART	Deployable Automatic Relay Terminal
DASC	Direct Air Support Center
DFS	Defile System
DIA	Defense Intelligence Agency
DMZ	Demilitarized Zone
DOD	Department of Defense
ELINT	Electronic Intelligence
FA	Field Artillery
FAC	Forward Air Controller
FBL	Forward Bomb Line
FSCC	Fire Support Control Center
FSCL	Fire Support Coordination Line
GSC	Ground Surveillance Center
GSR	Ground Surveillance Radar
HANDSID	Hand Emplaced Seismic Intrusion Device
H&I	Harassment and Interdiction
ISC	Infiltration Surveillance Center
JCS	Joint Chiefs of Staff
KIA	Killed in Action
Km	Kilometer
LOC	Line of Communications

MACV	Military Assistance Command, Vietnam
MAF	Marine Amphibious Force
MAGID	Magnetic Intrusion Device
MarDiv	Marine Division
MAW	Marine Air Wing
MPH	Miles Per Hour
NGF	Naval Gunfire
NKP	Nakhon Phanom
NOD	Night Observation Device
NVA	North Vietnamese Army
PCV	Provisional Corps Vietnam
ROE	Rules of Engagement
RP	Route Package
RVN	Republic of Vietnam
SAC	Strategic Air Command
SAM	Surface-to-Air Missile
SLAM	Seek, Locate, Annihilate, Monitor
SLAR	Side-Looking Airborne Radar
TACC	Tactical Air Control Center
TSC	Tactical Surveillance Center
UFO	Unidentified Flying Object
VC	Viet Cong
VR	Visual Reconnaissance
WAIS	Weekly Air Intelligence Summary

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